

Appendix table 5-1.

**Total, federally funded, and nonfederally funded academic R&D, by basic research, applied research, and development: 1953–2000  
(Percentages)**

Year	Total academic R&D				Federally supported academic R&D				Nonfederally supported academic R&D			
	Total academic	Basic research	Applied research	Development	Total academic	Basic research	Applied research	Development	Total academic	Basic research	Applied research	Development
1953 .....	100.0	45.1	49.1	5.9	54.6	55.0	39.6	6.0	45.4	33.1	60.5	5.6
1954 .....	100.0	49.2	45.5	5.6	54.8	58.8	36.4	5.5	45.2	37.5	56.6	5.9
1955 .....	100.0	52.6	41.5	6.1	55.8	61.3	33.0	6.3	44.2	41.7	52.3	6.0
1956 .....	100.0	56.3	37.3	6.4	56.5	64.7	29.4	6.3	43.5	45.3	47.6	6.5
1957 .....	100.0	60.3	33.9	6.0	55.9	69.0	26.0	5.0	44.1	49.2	44.0	7.3
1958 .....	100.0	63.5	31.0	5.7	57.0	72.1	23.6	4.6	43.0	52.1	40.8	7.1
1959 .....	100.0	66.2	28.5	5.3	60.8	73.9	21.9	4.5	39.2	54.3	38.7	6.5
1960 .....	100.0	68.8	26.4	5.0	64.3	75.3	20.5	4.2	35.7	57.1	36.9	6.3
1961 .....	100.0	71.7	23.9	4.6	66.8	77.6	18.7	3.9	33.2	59.9	34.3	5.8
1962 .....	100.0	74.2	21.8	4.0	69.2	79.5	17.3	3.3	30.8	62.4	31.7	5.6
1963 .....	100.0	77.2	19.5	3.4	71.2	82.1	15.3	2.6	28.8	64.9	30.1	5.3
1964 .....	100.0	77.9	18.6	3.6	72.4	82.8	14.3	3.0	27.6	65.0	30.0	5.0
1965 .....	100.0	76.6	19.1	4.5	73.2	80.9	15.1	4.1	26.8	64.7	29.9	5.4
1966 .....	100.0	75.9	19.3	4.8	73.4	79.9	15.6	4.6	26.6	65.0	29.6	5.4
1967 .....	100.0	76.4	19.1	4.6	73.3	79.7	16.0	4.4	26.7	67.3	27.8	5.0
1968 .....	100.0	76.9	18.5	4.7	72.5	79.8	15.8	4.5	27.5	69.2	25.8	5.0
1969 .....	100.0	76.9	18.3	4.8	71.2	79.3	15.8	4.9	28.8	71.0	24.4	4.6
1970 .....	100.0	76.7	18.7	4.6	69.7	78.5	16.6	5.0	30.3	72.7	23.4	3.8
1971 .....	100.0	76.7	19.5	3.8	68.6	78.7	17.4	3.9	31.4	72.4	24.0	3.6
1972 .....	100.0	73.9	22.5	3.7	68.6	76.0	20.7	3.3	31.4	69.3	26.3	4.4
1973 .....	100.0	71.2	24.6	4.3	68.0	74.1	22.4	3.5	32.0	65.0	29.1	5.8
1974 .....	100.0	71.0	24.7	4.4	67.2	74.5	22.1	3.5	32.8	63.7	30.0	6.3
1975 .....	100.0	69.5	26.2	4.4	67.2	73.7	22.9	3.5	32.8	60.9	32.8	6.2
1976 .....	100.0	68.6	26.7	4.7	67.2	73.5	22.8	3.8	32.8	58.7	34.8	6.4
1977 .....	100.0	68.3	25.9	5.8	66.6	73.1	21.6	5.3	33.4	58.7	34.4	7.0
1978 .....	100.0	67.6	25.0	7.5	66.6	72.1	20.3	7.6	33.4	58.6	34.3	7.1
1979 .....	100.0	67.0	24.8	8.2	67.3	70.7	20.6	8.7	32.7	59.4	33.5	7.1
1980 .....	100.0	66.8	25.1	8.0	67.2	70.6	21.0	8.4	32.8	59.2	33.5	7.4
1981 .....	100.0	66.9	25.1	8.0	65.9	71.3	20.4	8.3	34.1	58.2	34.3	7.5
1982 .....	100.0	67.0	25.2	7.9	64.2	71.2	20.6	8.1	35.8	59.3	33.3	7.3
1983 .....	100.0	66.9	25.6	7.5	63.1	70.8	21.5	7.7	36.9	60.1	32.7	7.2
1984 .....	100.0	67.1	25.5	7.4	62.8	71.1	21.3	7.6	37.2	60.4	32.5	7.1
1985 .....	100.0	68.2	24.5	7.3	62.0	72.1	20.3	7.6	38.0	61.7	31.4	6.9
1986 .....	100.0	68.8	24.1	7.1	60.9	72.9	19.8	7.3	39.1	62.5	30.7	6.8
1987 .....	100.0	67.5	25.1	7.4	60.7	71.2	21.2	7.7	39.3	61.9	31.3	6.9
1988 .....	100.0	65.7	26.6	7.7	60.4	69.1	22.8	8.1	39.6	60.5	32.4	7.1
1989 .....	100.0	65.4	26.8	7.8	59.6	68.9	22.8	8.3	40.4	60.1	32.7	7.2
1990 .....	100.0	65.7	26.0	8.3	58.7	69.3	21.5	9.1	41.3	60.5	32.4	7.1
1991 .....	100.0	66.3	25.3	8.4	58.6	69.6	20.9	9.5	41.4	61.5	31.5	6.9
1992 .....	100.0	66.6	25.2	8.2	59.5	69.9	20.9	9.1	40.5	61.7	31.4	6.9
1993 .....	100.0	66.6	25.1	8.3	60.0	70.2	20.6	9.2	40.0	61.2	31.9	7.0
1994 .....	100.0	66.7	24.9	8.4	60.1	70.3	20.3	9.3	39.9	61.1	31.9	7.0
1995 .....	100.0	67.0	25.0	8.0	60.1	70.9	20.4	8.7	39.9	61.1	31.9	7.0
1996 .....	100.0	67.7	24.8	7.5	59.4	71.7	20.3	8.0	40.6	61.8	31.3	6.9
1997 .....	100.0	67.8	24.5	7.7	58.7	72.1	19.7	8.2	41.3	61.8	31.4	6.9
1998 .....	100.0	68.0	24.3	7.7	58.5	72.9	19.0	8.2	41.5	61.3	31.8	7.0
1999 .....	100.0	68.5	24.0	7.4	58.2	73.6	18.6	7.8	41.8	61.5	31.6	6.9
2000 .....	100.0	68.5	24.1	7.4	58.0	73.6	18.6	7.8	42.0	61.5	31.6	6.9

NOTES: Data for 1999 and 2000 are preliminary, and data for all years are reported on a calendar year basis rather than an academic year basis. See appendix tables 4-3, 4-7, 4-11, and 4-15 for the data underlying these percentages.

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *National Patterns of R&D Resources*, various issues (Arlington, VA).

See figure 5-2 in Volume 1.

Science & Engineering Indicators – 2002

Appendix table 5-2.

**Support for academic R&D, by sector: 1953–2000**

Year	Total	Source of support				
		Federal Government	State/local government	Industry	Academic institutions	All other sources
<b>Millions of current dollars</b>						
1953 .....	273	149	40	21	37	27
1954 .....	301	165	45	24	40	29
1955 .....	342	191	50	27	42	32
1956 .....	391	221	57	32	46	36
1957 .....	433	242	64	37	51	40
1958 .....	491	280	72	39	56	45
1959 .....	586	356	81	40	61	50
1960 .....	705	453	90	40	67	55
1961 .....	834	557	101	40	75	62
1962 .....	993	687	112	41	84	70
1963 .....	1,178	839	125	41	96	78
1964 .....	1,375	995	138	41	114	88
1965 .....	1,595	1,167	150	42	136	101
1966 .....	1,818	1,335	160	45	165	114
1967 .....	2,035	1,491	168	52	200	126
1968 .....	2,187	1,586	185	58	221	139
1969 .....	2,280	1,624	208	61	233	155
1970 .....	2,418	1,686	237	66	259	171
1971 .....	2,565	1,760	262	72	290	182
1972 .....	2,757	1,890	282	79	312	195
1973 .....	2,953	2,009	302	90	343	211
1974 .....	3,216	2,160	320	104	393	239
1975 .....	3,570	2,400	348	118	432	272
1976 .....	3,899	2,619	369	131	480	300
1977 .....	4,346	2,893	394	155	569	337
1978 .....	4,996	3,329	443	182	679	364
1979 .....	5,715	3,848	482	215	785	386
1980 .....	6,455	4,335	519	264	920	419
1981 .....	7,085	4,670	581	314	1,058	463
1982 .....	7,603	4,879	621	363	1,207	534
1983 .....	8,251	5,210	658	432	1,357	595
1984 .....	9,154	5,748	721	518	1,514	654
1985 .....	10,308	6,388	834	630	1,743	713
1986 .....	11,540	7,028	969	745	2,019	780
1987 .....	12,807	7,768	1,065	831	2,262	882
1988 .....	14,220	8,592	1,165	933	2,527	1,003
1989 .....	15,632	9,315	1,274	1,061	2,852	1,131
1990 .....	16,936	9,936	1,399	1,166	3,187	1,249
1991 .....	18,202	10,663	1,483	1,242	3,457	1,358
1992 .....	19,384	11,524	1,525	1,320	3,568	1,448
1993 .....	20,485	12,300	1,556	1,391	3,708	1,530
1994 .....	21,591	12,985	1,621	1,455	3,936	1,594
1995 .....	22,599	13,580	1,750	1,547	4,108	1,616
1996 .....	23,686	14,067	1,858	1,667	4,430	1,665
1997 .....	25,088	14,716	1,926	1,812	4,846	1,790
1998 .....	26,664	15,589	1,987	1,971	5,183	1,934
1999 .....	28,363	16,518	2,083	2,133	5,562	2,066
2000 .....	30,154	17,475	2,197	2,310	5,969	2,203

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-2.  
**Support for academic R&D, by sector: 1953–2000**

Year	Total	Source of support			
		Federal Government	State/local government	Industry	Academic institutions
<b>Millions of constant 1996 dollars<sup>a</sup></b>					
1953 .....	1,416	774	205	106	190
1954 .....	1,548	846	229	121	203
1955 .....	1,729	966	253	137	212
1956 .....	1,912	1,081	276	154	225
1957 .....	2,049	1,143	303	173	241
1958 .....	2,269	1,294	333	180	256
1959 .....	2,678	1,625	368	181	279
1960 .....	3,175	2,039	406	180	302
1961 .....	3,714	2,480	448	178	332
1962 .....	4,365	3,019	493	178	369
1963 .....	5,122	3,646	543	176	417
1964 .....	5,889	4,263	589	174	486
1965 .....	6,705	4,907	629	175	572
1966 .....	7,433	5,458	654	184	673
1967 .....	8,072	5,912	666	204	791
1968 .....	8,316	6,030	702	219	838
1969 .....	8,264	5,884	754	219	845
1970 .....	8,319	5,800	816	225	890
1971 .....	8,404	5,765	858	236	949
1972 .....	8,664	5,940	886	248	979
1973 .....	8,789	5,978	897	266	1,021
1974 .....	8,781	5,898	874	284	1,072
1975 .....	8,917	5,996	869	295	1,078
1976 .....	9,216	6,191	872	310	1,135
1977 .....	9,653	6,425	875	343	1,263
1978 .....	10,358	6,901	919	376	1,408
1979 .....	10,937	7,365	922	411	1,502
1980 .....	11,317	7,599	909	462	1,612
1981 .....	11,360	7,487	932	503	1,696
1982 .....	11,475	7,364	937	548	1,821
1983 .....	11,979	7,564	955	627	1,969
1984 .....	12,813	8,045	1,009	724	2,119
1985 .....	13,988	8,669	1,131	855	2,365
1986 .....	15,323	9,331	1,287	989	2,680
1987 .....	16,508	10,013	1,372	1,071	2,916
1988 .....	17,728	10,712	1,452	1,163	3,150
1989 .....	18,773	11,186	1,530	1,274	3,425
1990 .....	19,577	11,485	1,617	1,347	3,683
1991 .....	20,301	11,893	1,653	1,385	3,856
1992 .....	21,106	12,548	1,660	1,437	3,885
1993 .....	21,780	13,078	1,654	1,479	3,942
1994 .....	22,488	13,525	1,688	1,515	4,100
1995 .....	23,036	13,843	1,783	1,576	4,187
1996 .....	23,686	14,067	1,858	1,667	4,430
1997 .....	24,608	14,434	1,889	1,777	4,753
1998 .....	25,832	15,103	1,925	1,910	5,021
1999 .....	27,072	15,766	1,988	2,036	5,309
2000 .....	28,205	16,345	2,055	2,161	5,583

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-2.  
**Support for academic R&D, by sector: 1953–2000**

Year	Total	Source of support				
		Federal Government	State/local government	Industry	Academic institutions	All other sources
Percent						
1953 .....	100.0	54.6	14.7	7.7	13.6	9.9
1954 .....	100.0	54.8	15.0	8.0	13.3	9.6
1955 .....	100.0	55.8	14.6	7.9	12.3	9.4
1956 .....	100.0	56.5	14.6	8.2	11.8	9.2
1957 .....	100.0	55.9	14.8	8.5	11.8	9.2
1958 .....	100.0	57.0	14.7	7.9	11.4	9.2
1959 .....	100.0	60.8	13.8	6.8	10.4	8.5
1960 .....	100.0	64.3	12.8	5.7	9.5	7.8
1961 .....	100.0	66.8	12.1	4.8	9.0	7.4
1962 .....	100.0	69.2	11.3	4.1	8.5	7.0
1963 .....	100.0	71.2	10.6	3.5	8.1	6.6
1964 .....	100.0	72.4	10.0	3.0	8.3	6.4
1965 .....	100.0	73.2	9.4	2.6	8.5	6.3
1966 .....	100.0	73.4	8.8	2.5	9.1	6.3
1967 .....	100.0	73.3	8.3	2.6	9.8	6.2
1968 .....	100.0	72.5	8.5	2.7	10.1	6.4
1969 .....	100.0	71.2	9.1	2.7	10.2	6.8
1970 .....	100.0	69.7	9.8	2.7	10.7	7.1
1971 .....	100.0	68.6	10.2	2.8	11.3	7.1
1972 .....	100.0	68.6	10.2	2.9	11.3	7.1
1973 .....	100.0	68.0	10.2	3.0	11.6	7.1
1974 .....	100.0	67.2	10.0	3.2	12.2	7.4
1975 .....	100.0	67.2	9.7	3.3	12.1	7.6
1976 .....	100.0	67.2	9.5	3.4	12.3	7.7
1977 .....	100.0	66.6	9.1	3.6	13.1	7.8
1978 .....	100.0	66.6	8.9	3.6	13.6	7.3
1979 .....	100.0	67.3	8.4	3.8	13.7	6.8
1980 .....	100.0	67.2	8.0	4.1	14.3	6.5
1981 .....	100.0	65.9	8.2	4.4	14.9	6.5
1982 .....	100.0	64.2	8.2	4.8	15.9	7.0
1983 .....	100.0	63.1	8.0	5.2	16.4	7.2
1984 .....	100.0	62.8	7.9	5.7	16.5	7.1
1985 .....	100.0	62.0	8.1	6.1	16.9	6.9
1986 .....	100.0	60.9	8.4	6.5	17.5	6.8
1987 .....	100.0	60.7	8.3	6.5	17.7	6.9
1988 .....	100.0	60.4	8.2	6.6	17.8	7.1
1989 .....	100.0	59.6	8.1	6.8	18.2	7.2
1990 .....	100.0	58.7	8.3	6.9	18.8	7.4
1991 .....	100.0	58.6	8.1	6.8	19.0	7.5
1992 .....	100.0	59.5	7.9	6.8	18.4	7.5
1993 .....	100.0	60.0	7.6	6.8	18.1	7.5
1994 .....	100.0	60.1	7.5	6.7	18.2	7.4
1995 .....	100.0	60.1	7.7	6.8	18.2	7.2
1996 .....	100.0	59.4	7.8	7.0	18.7	7.0
1997 .....	100.0	58.7	7.7	7.2	19.3	7.1
1998 .....	100.0	58.5	7.5	7.4	19.4	7.3
1999 .....	100.0	58.2	7.3	7.5	19.6	7.3
2000 .....	100.0	58.0	7.3	7.7	19.8	7.3

<sup>a</sup>See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1996 dollars.

NOTES: Data for 1999 and 2000 are preliminary, and data for all years are reported on a calendar year basis rather than an academic year basis. Data in subsequent appendix tables are reported on an academic year basis and therefore differ from those reported in this table.

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *National Patterns of R&D Resources, various issues* (Arlington, VA).

See figure 5-4 in Volume 1.

Appendix table 5-3.  
**Sources of R&D funds at private and public institutions: 1979, 1989, and 1999**

Institution type	Source of funds											
	Total		Federal Government		State/local government		Industry		Academic institutions		Other sources	
	Dollars (millions)	Percent	Dollars (millions)	Percent	Dollars (millions)	Percent	Dollars (millions)	Percent	Dollars (millions)	Percent	Dollars (millions)	Percent
<b>1979</b>												
All .....	5,366.1	100.0	3,598.2	67.1	471.9	8.8	193.2	3.6	735.1	13.7	367.7	6.9
Private .....	1,978.5	100.0	1,551.5	78.4	48.0	2.4	81.5	4.1	144.2	7.3	153.3	7.7
Public .....	3,387.6	100.0	2,046.7	60.4	423.8	12.5	111.7	3.3	590.9	17.4	214.5	6.3
<b>1989</b>												
All .....	14,976.5	100.0	8,990.6	60.0	1,223.6	8.2	993.7	6.6	2,697.8	18.0	1,070.8	7.1
Private .....	5,165.3	100.0	3,796.2	73.5	123.2	2.4	361.7	7.0	451.4	8.7	432.8	8.4
Public .....	9,811.2	100.0	5,194.4	52.9	1,100.4	11.2	632.0	6.4	2,246.4	22.9	638.0	6.5
<b>1999</b>												
All .....	27,489.1	100.0	16,046.8	58.4	2,028.4	7.4	2,047.7	7.4	5,366.2	19.5	1,999.9	7.3
Private .....	8,860.8	100.0	6,379.7	72.0	176.7	2.0	691.1	7.8	837.6	9.5	775.7	8.8
Public .....	18,628.2	100.0	9,667.1	51.9	1,851.7	9.9	1,356.6	7.3	4,528.6	24.3	1,224.3	6.6

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Academic Science and Engineering R&D Expenditures: Fiscal Year 1999, Detailed Statistical Tables*, NSF 01-329 (Arlington, VA, 2001); and NSF, annual series.

See figure 5-6 in Volume 1.

Science & Engineering Indicators – 2002

Appendix table 5-4.

**R&D expenditures at the top 100 academic institutions, by source of funds: 1999**  
 (Millions of current dollars)

Rank and academic institution	Institution type	Source of funds				
		Total	Federal Government	State/local government	Industry	All other sources
<b>All institutions</b>		27,489	16,047	2,028	2,048	5,366
1 University of Michigan, all campuses	Public	509	334	5	34	103
2 University of Washington-Seattle	Public	483	368	12	51	43
3 University of California-Los Angeles	Public	478	252	10	34	108
4 University of Wisconsin-Madison	Public	463	250	39	14	102
5 University of California-San Diego	Public	462	292	22	31	72
6 University of California-Berkeley	Public	452	191	48	22	149
7 Johns Hopkins University <sup>a</sup>	Private	439	352	1	15	26
8 Johns Hopkins University Applied Physics Lab	Private	436	419	0	0	17
9 Stanford University	Private	427	354	3	32	19
10 Massachusetts Institute of Technology	Private	420	309	—	75	13
<b>Top 10 institutions</b>		4,566	3,121	140	310	652
11 University of California-San Francisco	Public	417	233	19	37	72
12 Texas A&M University, all campuses	Public	402	149	95	35	115
13 Cornell University, all campuses	Private	396	235	38	12	75
14 University of Pennsylvania	Private	384	279	2	30	33
15 Pennsylvania State University, all campuses	Public	379	199	16	66	99
16 University of Minnesota, all campuses	Public	371	208	49	24	62
17 University of Illinois at Urbana-Champaign	Public	358	186	38	13	107
18 Duke University	Private	348	187	6	122	14
19 Harvard University	Private	326	266	2	12	0
20 Ohio State University, all campuses	Public	323	135	50	52	59
<b>Top 20 institutions</b>		8,271	5,198	454	712	1,288
21 University of Arizona	Public	320	178	8	17	104
22 University of Colorado, all campuses	Public	319	245	6	10	25
23 Washington University	Private	316	219	7	20	35
24 University of California-Davis	Public	308	124	22	16	120
25 University of Florida	Public	304	122	66	28	78
26 University of Southern California	Private	281	200	9	23	49
27 Columbia University in the City of New York	Private	280	240	1	3	11
28 Yale University	Private	274	213	—	15	17
29 Baylor College of Medicine	Private	272	141	2	19	39
30 North Carolina State University at Raleigh	Public	271	66	97	31	75
<b>Top 30 institutions</b>		11,215	6,946	673	894	1,842
31 Georgia Institute of Technology, all campuses	Public	264	113	14	63	74
32 University of Texas at Austin	Public	258	165	18	40	31
33 University of Maryland at College Park	Public	258	145	45	3	57
34 University of North Carolina at Chapel Hill	Public	253	183	15	6	49
35 University of Pittsburgh, all campuses	Public	249	195	1	13	22
36 University of Georgia	Public	237	56	47	11	122
37 Northwestern University	Private	234	133	4	14	58
38 University of Alabama at Birmingham	Public	232	165	1	10	18
39 Purdue University, all campuses	Public	226	96	26	29	76
40 Louisiana State University, all campuses	Public	226	76	69	13	54
<b>Top 40 institutions</b>		13,652	8,272	913	1,096	2,403
41 Rutgers the State University of New Jersey, all campuses	Public	214	76	25	10	85
42 California Institute of Technology	Private	212	195	—	6	8
43 Michigan State University	Public	208	90	37	8	65
44 University of Iowa	Public	207	123	5	21	48
45 Indiana University, all campuses	Public	195	102	2	5	69
46 Emory University	Private	189	133	4	8	19
47 Case Western Reserve University	Private	182	140	3	6	17
48 University of Rochester	Private	177	133	8	18	7
49 University of Illinois at Chicago	Public	175	86	6	10	59
50 University of Kentucky, all campuses	Public	174	66	11	15	79
<b>Top 50 institutions</b>		15,586	9,416	1,015	1,203	2,858
1,092						

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-4.

**R&D expenditures at the top 100 academic institutions, by source of funds: 1999**  
 (Millions of current dollars)

Rank and academic institution	Institution type	Source of funds					All other sources
		Total	Federal Government	State/local government	Industry	Academic institutions	
51 Virginia Polytechnic Institute and State University .....	Public	169	75	37	13	40	4
52 New York University .....	Private	167	111	1	8	18	30
53 SUNY at Buffalo, all campuses .....	Public	167	85	5	5	42	29
54 University of Texas Southwestern Medical Center Dallas .....	Public	166	102	5	16	1	41
55 University of Chicago .....	Private	163	136	—	2	9	16
56 Iowa State University .....	Public	161	54	48	15	41	3
57 University of Tennessee system .....	Public	159	70	29	15	30	14
58 University of Virginia, all campuses .....	Public	157	108	6	13	16	14
59 University of Hawaii at Manoa .....	Public	157	93	35	13	15	0
60 University of Texas M.D. Anderson Cancer Center .....	Public	155	69	0	0	51	35
<b>Top 60 institutions .....</b>		<b>17,207</b>	<b>10,322</b>	<b>1,182</b>	<b>1,303</b>	<b>3,121</b>	<b>1,277</b>
61 University of Utah .....	Public	154	112	2	9	23	8
62 University of Cincinnati, all campuses .....	Public	153	100	4	6	33	10
63 Colorado State University .....	Public	150	92	17	7	34	—
64 Vanderbilt University .....	Private	150	117	—	4	15	14
65 University of Missouri, Columbia .....	Public	149	54	17	4	68	7
66 SUNY at Stony Brook, all campuses .....	Public	149	94	3	7	38	6
67 Wayne State University .....	Public	147	58	13	11	49	17
68 Carnegie Mellon University .....	Private	142	90	18	18	9	7
69 University of Oklahoma, all campuses .....	Public	142	58	16	8	45	16
70 University of California-Irvine .....	Public	142	76	4	17	28	17
<b>Top 70 institutions .....</b>		<b>18,685</b>	<b>11,172</b>	<b>1,276</b>	<b>1,393</b>	<b>3,464</b>	<b>1,379</b>
71 Boston University .....	Private	141	123	1	8	0	9
72 University of Maryland at Baltimore .....	Public	141	85	24	12	9	11
73 University of Miami .....	Private	140	102	1	16	6	14
74 Oregon State University .....	Public	139	82	29	—	24	4
75 University of Connecticut, all campuses .....	Public	135	55	10	10	48	11
76 University of Kansas, all campuses .....	Public	133	57	11	14	36	13
77 University of Nebraska at Lincoln .....	Public	131	37	4	5	78	7
78 Mount Sinai School of Medicine .....	Private	128	85	3	9	16	15
79 University of Medicine and Dentistry of New Jersey .....	Public	126	62	8	11	35	10
80 Princeton University .....	Private	124	73	2	6	29	14
<b>Top 80 institutions .....</b>		<b>20,023</b>	<b>11,932</b>	<b>1,370</b>	<b>1,484</b>	<b>3,746</b>	<b>1,488</b>
81 University of South Florida .....	Public	124	42	7	6	57	11
82 Rockefeller University .....	Private	122	45	2	3	40	31
83 University of New Mexico, all campuses .....	Public	116	85	2	3	22	4
84 Oregon Health Sciences University .....	Public	112	76	3	8	15	9
85 Yeshiva University .....	Private	112	90	0	0	21	1
86 Georgetown University .....	Private	111	84	—	8	12	7
87 Mississippi State University .....	Public	111	47	26	8	30	0
88 Arizona State University .....	Public	107	54	2	4	44	3
89 University of South Carolina .....	Public	106	48	4	2	47	4
90 University of Texas Health Science Center Houston .....	Public	105	71	2	13	6	13
<b>Top 90 institutions .....</b>		<b>21,149</b>	<b>12,574</b>	<b>1,420</b>	<b>1,539</b>	<b>4,041</b>	<b>1,572</b>

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-4.

**R&D expenditures at the top 100 academic institutions, by source of funds: 1999**  
 (Millions of current dollars)

Rank and academic institution	Institution type	Source of funds					All other sources
		Total	Federal Government	State/local government	Industry	Academic institutions	
91 University of California-Santa Barbara .....	Public	105	74	2	5	16	8
92 Tufts University .....	Private	102	64	—	7	20	10
93 Clemson University .....	Public	99	27	21	8	38	4
94 Florida State University .....	Public	98	56	2	1	37	2
95 Washington State University .....	Public	97	45	4	3	35	11
96 Utah State University .....	Public	95	54	17	4	17	4
97 University of Texas Medical Branch at Galveston .....	Public	94	55	10	6	11	11
98 University of Alaska Fairbanks .....	Public	89	35	4	19	31	—
99 University of Texas Health Science Center San Antonio .....	Public	88	57	7	11	8	6
100 Tulane University .....	Private	87	51	3	12	18	4
<b>Top 100 institutions .....</b>		<b>22,102</b>	<b>13,091</b>	<b>1,488</b>	<b>1,616</b>	<b>4,271</b>	<b>1,632</b>

— = less than \$1 million

<sup>a</sup>These figures exclude the Applied Physics Laboratory (APL) at Johns Hopkins University, which, although not officially classified as a federally funded research and development center, essentially functions as one and performs almost as much R&D as performed at the university. APL is included as a separate entry to provide a better measure of the distribution of academic R&D dollars and the ranking of individual institutions.

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Academic Science and Engineering R&D Expenditures: Fiscal Year 1999, Detailed Statistical Tables*, NSF 01-329 (Arlington, VA, 2001); and NSF, unpublished tabulations.

Appendix table 5-5.

**Expenditure allocation among instruction, research, and public service at academic institutions,  
by type of control: 1977–96**

Year	Private academic institutions				Public academic institutions			
	Instruction, research, and public service		Instruction	Research	Instruction, research, and public service		Instruction	Research
	<b>Millions of current dollars</b>							
1977 .....	5,234	3,776	1,279	179	13,307	9,975	2,274	1,058
1978 .....	5,694	4,132	1,369	192	14,517	10,895	2,493	1,129
1979 .....	6,275	4,538	1,522	215	15,950	11,817	2,862	1,270
1980 .....	7,084	5,110	1,712	262	17,795	13,034	3,308	1,453
1981 .....	7,966	5,815	1,863	287	19,890	14,531	3,713	1,646
1982 .....	8,855	6,549	1,956	350	21,623	15,987	3,897	1,739
1983 .....	9,599	7,156	2,051	393	23,040	17,078	4,135	1,826
1984 .....	10,416	7,782	2,207	427	24,630	18,212	4,437	1,982
1985 .....	11,446	8,437	2,484	524	27,079	19,872	4,964	2,243
1986 .....	12,460	9,092	2,786	582	29,362	21,401	5,522	2,440
1987 .....	14,175	10,290	3,152	733	31,525	22,823	6,051	2,651
1988 .....	15,120	10,877	3,432	810	34,222	24,462	6,823	2,937
1989 .....	16,537	11,938	3,712	887	37,374	26,470	7,609	3,294
1990 .....	17,937	12,898	4,039	1,000	40,857	28,878	8,338	3,641
1991 .....	19,441	14,170	4,173	1,097	43,722	30,682	9,127	3,913
1992 .....	20,884	15,262	4,401	1,221	46,669	32,602	9,816	4,251
1993 .....	22,381	16,203	4,780	1,398	49,026	34,058	10,476	4,493
1994 .....	23,807	17,227	5,041	1,540	51,144	35,417	11,051	4,676
1995 .....	25,384	18,293	5,392	1,699	54,124	37,432	11,696	4,995
1996 .....	26,545	19,188	5,555	1,803	56,113	38,769	12,041	5,302
<b>Millions of constant 1996 dollars</b>								
1977 .....	11,626	8,387	2,841	397	29,558	22,157	5,051	2,350
1978 .....	11,805	8,568	2,839	398	30,100	22,591	5,169	2,340
1979 .....	12,010	8,685	2,914	411	30,527	22,617	5,478	2,431
1980 .....	12,419	8,959	3,001	459	31,197	22,850	5,800	2,547
1981 .....	12,772	9,324	2,988	461	31,890	23,298	5,952	2,639
1982 .....	13,367	9,886	2,953	528	32,639	24,131	5,883	2,625
1983 .....	13,936	10,388	2,977	570	33,449	24,794	6,004	2,651
1984 .....	14,580	10,894	3,089	597	34,477	25,492	6,211	2,774
1985 .....	15,532	11,449	3,371	712	36,747	26,967	6,737	3,044
1986 .....	16,545	12,072	3,700	772	38,989	28,417	7,332	3,239
1987 .....	18,272	13,264	4,063	944	40,636	29,419	7,800	3,418
1988 .....	18,850	13,561	4,279	1,010	42,665	30,498	8,506	3,662
1989 .....	19,860	14,336	4,458	1,065	44,882	31,788	9,138	3,956
1990 .....	20,734	14,909	4,669	1,156	47,227	33,381	9,638	4,209
1991 .....	21,683	15,804	4,654	1,224	48,764	34,220	10,180	4,364
1992 .....	22,739	16,618	4,792	1,329	50,816	35,499	10,688	4,629
1993 .....	23,797	17,228	5,083	1,487	52,128	36,212	11,139	4,777
1994 .....	24,797	17,943	5,250	1,604	53,269	36,889	11,510	4,870
1995 .....	25,875	18,647	5,496	1,732	55,172	38,157	11,923	5,092
1996 .....	26,545	19,188	5,555	1,803	56,113	38,769	12,041	5,302

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-5.

**Expenditure allocation among instruction, research, and public service at academic institutions,  
by type of control: 1977–96**

Year	Private academic institutions				Public academic institutions			
	Instruction, research, and public service		Instruction	Research	Instruction, research, and public service		Instruction	Research
	<b>Percent</b>							
1977 .....	100	72	24	3	100	75	17	8
1978 .....	100	73	24	3	100	75	17	8
1979 .....	100	72	24	3	100	74	18	8
1980 .....	100	72	24	4	100	73	19	8
1981 .....	100	73	23	4	100	73	19	8
1982 .....	100	74	22	4	100	74	18	8
1983 .....	100	75	21	4	100	74	18	8
1984 .....	100	75	21	4	100	74	18	8
1985 .....	100	74	22	5	100	73	18	8
1986 .....	100	73	22	5	100	73	19	8
1987 .....	100	73	22	5	100	72	19	8
1988 .....	100	72	23	5	100	71	20	9
1989 .....	100	72	22	5	100	71	20	9
1990 .....	100	72	23	6	100	71	20	9
1991 .....	100	73	21	6	100	70	21	9
1992 .....	100	73	21	6	100	70	21	9
1993 .....	100	72	21	6	100	69	21	9
1994 .....	100	72	21	6	100	69	22	9
1995 .....	100	72	21	7	100	69	22	9
1996 .....	100	72	21	7	100	69	21	9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System Finance Survey, special tabulations.

See figure 5-8 in volume I.

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Appendix table 5-6.

**Expenditure allocation among instruction, research, and public service at academic institutions, by type of control and selected Carnegie classification: 1977–96**  
 (Millions of current dollars)

Year	Private academic institutions				Public academic institutions			
	Research I	Research II	Doctorate-granting I	Doctorate-granting II	Research I	Research II	Doctorate-granting I	Doctorate-granting II
			<b>Instruction</b>					
1977 .....	1,283	215	255	206	2,941	744	529	492
1978 .....	1,387	240	283	235	3,223	820	558	533
1979 .....	1,522	260	308	255	3,548	894	619	576
1980 .....	1,755	294	334	278	3,940	984	669	647
1981 .....	2,007	327	378	326	4,359	1,105	734	730
1982 .....	2,287	366	415	360	4,772	1,228	803	797
1983 .....	2,503	409	445	399	5,056	1,329	851	865
1984 .....	2,705	442	483	435	5,390	1,398	905	923
1985 .....	2,935	479	516	471	5,927	1,537	979	1,002
1986 .....	3,208	520	541	509	6,444	1,624	1,056	1,081
1987 .....	3,792	579	582	537	6,928	1,692	1,157	1,160
1988 .....	3,914	622	625	587	7,330	1,867	1,223	1,244
1989 .....	4,333	683	680	637	7,885	2,008	1,280	1,347
1990 .....	4,664	753	730	686	8,509	2,179	1,373	1,458
1991 .....	5,141	813	771	768	9,012	2,317	1,504	1,564
1992 .....	5,554	880	809	847	9,533	2,416	1,542	1,627
1993 .....	5,949	910	843	896	9,859	2,497	1,604	1,700
1994 .....	6,337	951	930	962	10,180	2,584	1,733	1,747
1995 .....	6,735	1,005	994	1,028	10,870	2,755	1,807	1,827
1996 .....	6,890	956	1,061	1,042	11,235	2,815	1,864	1,929
<b>Research</b>								
1977 .....	980	60	39	46	1,605	281	36	101
1978 .....	1,050	66	38	49	1,767	295	37	129
1979 .....	1,159	72	47	50	1,991	339	46	144
1980 .....	1,299	80	49	56	2,292	387	50	166
1981 .....	1,409	93	51	57	2,587	442	55	176
1982 .....	1,486	100	54	63	2,750	468	53	188
1983 .....	1,565	106	50	65	2,947	477	54	194
1984 .....	1,683	115	52	72	3,154	496	62	214
1985 .....	1,904	125	61	79	3,547	547	80	224
1986 .....	2,121	138	62	92	3,948	601	98	249
1987 .....	2,417	147	72	96	4,302	625	140	271
1988 .....	2,588	171	77	108	4,789	714	166	333
1989 .....	2,775	179	84	120	5,339	801	156	387
1990 .....	3,016	195	100	126	5,843	887	173	431
1991 .....	3,136	207	103	150	6,347	960	217	486
1992 .....	3,306	214	112	174	6,832	995	233	525
1993 .....	3,568	232	117	198	7,245	1,042	263	573
1994 .....	3,745	237	127	204	7,597	1,102	274	619
1995 .....	4,034	249	129	208	7,963	1,167	295	663
1996 .....	4,142	261	149	206	8,163	1,201	315	711

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-6.

**Expenditure allocation among instruction, research, and public service at academic institutions, by type of control and selected Carnegie classification: 1977–96**  
 (Millions of current dollars)

Year	Private academic institutions				Public academic institutions			
	Research I	Research II	Doctorate-	Doctorate-	Research I	Research II	Doctorate-	Doctorate-
			granting I	granting II			granting I	granting II
<b>Public service</b>								
1977 .....	980	60	39	46	1,605	281	36	101
1978 .....	1,050	66	38	49	1,767	295	37	129
1979 .....	1,159	72	47	50	1,991	339	46	144
1980 .....	1,299	80	49	56	2,292	387	50	166
1981 .....	1,409	93	51	57	2,587	442	55	176
1982 .....	1,486	100	54	63	2,750	468	53	188
1983 .....	1,565	106	50	65	2,947	477	54	194
1984 .....	1,683	115	52	72	3,154	496	62	214
1985 .....	1,904	125	61	79	3,547	547	80	224
1986 .....	2,121	138	62	92	3,948	601	98	249
1987 .....	2,417	147	72	96	4,302	625	140	271
1988 .....	2,588	171	77	108	4,789	714	166	333
1989 .....	2,775	179	84	120	5,339	801	156	387
1990 .....	3,016	195	100	126	5,843	887	173	431
1991 .....	3,136	207	103	150	6,347	960	217	486
1992 .....	3,306	214	112	174	6,832	995	233	525
1993 .....	3,568	232	117	198	7,245	1,042	263	573
1994 .....	3,745	237	127	204	7,597	1,102	274	619
1995 .....	4,034	249	129	208	7,963	1,167	295	663
1996 .....	4,142	261	149	206	8,163	1,201	315	711

SOURCE: U.S. Department of Education, National Center for Education Statistics Integrated Postsecondary Education Data System Finance Survey, special tabulations.

See figure 5-9 in volume I.

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Appendix table 5-7.

**Total, Federal, and non-Federal R&D expenditures at academic institutions, by field and source of funds: 1999**

Field	Total R&D		Millions of dollars		Percent	
	Millions of dollars	Percent	Federal	Non- Federal <sup>a</sup>	Federal	Non- Federal <sup>a</sup>
<b>Total S&amp;E</b> .....	27,489.1	100.0	16,046.8	11,442	58.4	41.6
<b>Total sciences</b> .....	23,231.9	84.5	13,608.5	9,623	58.6	41.4
Physical sciences .....	2,599.7	9.5	1,859.5	740	71.5	28.5
Astronomy .....	389.3	1.4	277.2	112	71.2	28.8
Chemistry .....	915.1	3.3	615.5	300	67.3	32.7
Physics .....	1,142.3	4.2	862.1	280	75.5	24.5
Other .....	153.0	0.6	104.7	48	68.5	31.5
Mathematics .....	312.7	1.1	209.1	104	66.9	33.1
Computer sciences .....	860.0	3.1	582.2	278	67.7	32.3
Environmental sciences .....	1,689.6	6.1	1,100.7	589	65.1	34.9
Atmospheric sciences .....	288.0	1.0	222.5	66	77.3	22.7
Earth sciences .....	543.9	2.0	320.2	224	58.9	41.1
Ocean sciences .....	601.8	2.2	403.7	198	67.1	32.9
Other .....	255.8	0.9	154.3	102	60.3	39.7
Life sciences .....	15,591.3	56.7	8,920.2	6,671	57.2	42.8
Agricultural sciences .....	2,031.4	7.4	545.6	1,486	26.9	73.1
Biological sciences .....	5,012.5	18.2	3,203.3	1,809	63.9	36.1
Medical sciences .....	7,990.9	29.1	4,848.1	3,143	60.7	39.3
Other .....	556.5	2.0	323.2	233	58.1	41.9
Psychology .....	464.9	1.7	310.1	155	66.7	33.3
Social sciences .....	1,262.0	4.6	472.3	790	37.4	62.6
Economics .....	270.0	1.0	90.0	180	33.3	66.7
Political science .....	201.2	0.7	53.8	147	26.7	73.3
Sociology .....	269.9	1.0	119.4	150	44.2	55.8
Other .....	521.0	1.9	209.2	312	40.2	59.8
Other sciences .....	451.8	1.6	154.3	298	34.1	65.9
<b>Total engineering</b> .....	4,257.1	15.5	2,438.3	1,819	57.3	42.7
Aeronautical/astronautical .....	260.3	0.9	182.9	77	70.3	29.7
Bioengineering/biomedical .....	137.0	0.5	72.3	65	52.8	47.2
Chemical .....	349.7	1.3	179.4	170	51.3	48.7
Civil .....	528.8	1.9	216.2	313	40.9	59.1
Electrical/electronic .....	1,019.7	3.7	651.6	368	63.9	36.1
Mechanical .....	625.4	2.3	387.8	238	62.0	38.0
Materials .....	384.8	1.4	218.0	167	56.6	43.4
Other .....	951.3	3.5	530.1	421	55.7	44.3

<sup>a</sup>See appendix table 5-2 for detail on non-Federal sources.SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Academic Science and Engineering R&D Expenditures: Fiscal Year 1999, Detailed Statistical Tables*, NSF 01-329 (Arlington, VA, 2001); and NSF, unpublished tabulations.

Appendix table 5-8.

**Percentage of academic R&D funds provided by the Federal Government, by field: 1973–99**

Field	1973	1976	1979	1982	1985	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>Total S&amp;E</b> .....	68.8	67.4	67.1	65.1	62.6	60.9	60.0	59.2	58.2	58.9	59.9	60.2	60.1	60.1	58.8	58.6	58.4
<b>Total sciences</b> .....	68.5	67.4	66.8	64.8	62.8	61.3	60.4	59.5	58.6	59.3	60.1	60.3	60.2	60.0	58.8	58.7	58.6
Physical sciences .....	81.8	80.5	81.5	78.9	77.5	74.5	72.7	72.8	71.4	71.8	71.0	71.8	72.6	72.2	71.1	71.0	71.5
Astronomy .....	73.4	69.8	74.8	70.6	67.0	66.1	64.0	66.1	64.4	66.5	63.8	67.7	68.2	66.1	63.7	62.1	71.2
Chemistry .....	76.1	77.0	75.8	74.7	74.2	71.3	69.6	68.7	67.3	68.1	68.2	68.2	69.1	69.1	67.3	67.0	67.3
Physics .....	87.1	85.3	86.5	83.5	82.2	78.4	77.1	77.5	77.1	76.9	75.3	76.0	77.0	76.7	76.2	75.9	75.5
Other .....	79.7	77.2	82.7	81.2	75.1	74.7	69.5	71.8	66.4	67.7	70.3	70.8	70.8	71.0	71.0	74.7	68.5
Mathematics .....	77.5	77.4	77.6	74.5	75.9	75.4	73.3	72.6	74.1	74.0	74.6	72.8	73.5	72.2	69.8	69.0	66.9
Computer sciences .....	69.9	74.0	70.9	74.2	69.7	70.8	68.5	66.5	67.0	68.4	69.7	71.5	70.9	72.7	71.3	68.8	67.7
Environmental sciences .....	75.2	73.4	72.6	70.1	67.2	65.9	64.8	63.8	62.7	63.7	66.0	67.6	67.1	67.6	66.3	66.3	65.1
Atmospheric sciences .....	NA	NA	NA	79.9	79.8	81.2	77.9	75.7	74.1	72.1	76.3	79.4	78.6	78.4	78.3	77.8	77.3
Earth sciences .....	NA	NA	NA	64.9	60.7	59.3	57.7	57.7	56.7	57.7	58.5	59.5	59.8	60.0	59.8	60.7	58.9
Ocean sciences .....	NA	NA	NA	77.4	72.7	71.6	72.5	69.4	67.6	71.7	72.0	71.0	70.0	69.6	66.2	66.4	67.1
Other .....	75.2	73.4	72.6	53.5	53.9	49.8	48.1	51.0	52.9	51.5	58.4	66.6	65.3	67.1	66.9	65.1	60.3
Life sciences .....	66.3	65.7	64.1	62.4	60.4	59.6	59.3	58.3	57.2	58.0	58.9	58.8	58.4	58.2	57.1	57.0	57.2
Agricultural sciences ...	34.1	29.7	30.2	29.5	29.4	27.4	27.3	26.1	25.9	27.6	28.9	29.7	29.3	29.3	27.9	26.7	26.9
Biological sciences ....	71.6	73.5	72.6	71.4	67.9	66.8	65.8	64.5	63.7	64.7	65.3	65.7	64.9	64.7	64.2	64.0	63.9
Medical sciences .....	75.3	75.5	73.7	72.0	68.0	65.5	65.5	64.3	62.7	62.7	63.3	62.7	63.0	63.0	61.2	60.9	60.7
Other .....	70.3	72.6	70.1	64.0	60.0	61.7	61.0	59.1	60.0	58.2	59.3	58.8	56.7	58.0	56.8	55.7	58.1
Psychology .....	79.5	76.2	72.3	68.1	66.9	65.9	65.5	64.8	65.8	65.4	67.0	67.1	67.2	67.7	68.5	67.3	66.7
Social sciences .....	57.3	52.7	53.0	45.6	40.1	34.2	33.5	32.2	33.7	34.5	37.7	37.6	38.1	38.6	36.3	37.6	37.4
Economics .....	47.6	44.5	48.4	43.7	37.0	30.2	29.1	27.1	28.6	29.8	33.4	31.4	32.0	33.4	34.6	35.3	33.3
Political science .....	40.6	42.2	46.0	37.3	33.1	29.0	25.0	22.0	22.8	24.7	28.3	31.1	34.5	34.6	29.5	30.3	26.7
Sociology .....	65.8	62.1	63.4	58.5	53.5	44.1	45.2	45.5	46.3	50.1	49.7	49.1	48.6	51.6	46.6	47.1	44.2
Other .....	61.0	54.8	52.2	42.8	38.5	34.4	34.9	33.9	35.5	34.2	38.4	38.4	37.8	36.4	34.1	36.5	40.2
Other sciences .....	58.7	59.5	54.9	56.5	49.3	41.9	40.1	41.1	33.8	32.4	35.1	37.0	44.9	41.5	40.7	38.4	34.1
<b>Total engineering</b> .....	71.5	67.3	68.7	67.2	61.2	58.7	57.8	57.4	56.4	57.2	58.9	59.4	59.8	60.2	58.7	57.8	57.3
Aeronautical/astronautical .....	NA	NA	NA	79.1	76.4	76.3	77.5	77.7	76.4	76.7	75.2	76.1	76.2	73.5	74.2	68.4	70.3
Bioengineering/biomedical .....	NA	61.9	55.5	52.8													
Chemical .....	NA	NA	NA	62.0	55.6	52.6	52.1	50.6	48.4	48.4	52.2	54.0	54.2	54.8	52.4	51.8	51.3
Civil .....	NA	NA	NA	51.5	51.5	45.6	41.7	41.2	39.3	42.3	41.6	40.6	43.2	43.5	42.4	39.8	40.9
Electrical/electronic .....	NA	NA	NA	77.1	67.7	64.9	65.0	65.1	64.2	63.9	65.7	65.8	66.4	67.6	66.0	66.4	63.9
Mechanical .....	NA	NA	NA	68.3	64.6	63.5	62.4	61.0	59.7	59.7	64.2	65.3	65.2	64.5	62.3	61.8	62.0
Materials .....	NA	50.9	50.4	48.7	50.3	50.2	53.2	54.5	57.2	56.6	56.6						
Other .....	71.5	67.3	68.7	65.3	57.3	54.9	53.6	54.6	54.8	57.6	58.9	60.1	58.4	59.7	55.8	55.4	55.7

NA = not available

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Academic Science and Engineering R&D Expenditures: Fiscal Year 1999, Detailed Statistical Tables*, NSF 01-329 (Arlington, VA, 2001); and NSF, unpublished tabulations.

Appendix table 5-9.  
**Expenditures for academic R&D, by field: 1973–99**

Field	1973	1976	1979	1982	1985	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
Millions of current dollars																		
<b>Total S&amp;E</b> .....	2,884	3,729	5,366	7,324	9,687	13,463	14,976	16,285	17,584	18,818	19,951	21,020	22,161	23,035	24,338	25,837	27,489	
<b>Total sciences</b> .....	2,551	3,297	4,591	6,296	8,269	11,367	12,584	13,629	14,677	15,755	16,795	17,665	18,647	19,328	20,491	21,768	23,232	
Physical sciences .....	328	379	602	824	1,148	1,554	1,647	1,807	1,939	2,055	2,130	2,176	2,254	2,256	2,362	2,483	2,600	
Astronomy .....	24	26	48	73	96	127	137	170	211	238	259	267	304	276	287	302	389	
Chemistry .....	114	140	206	308	422	565	606	648	671	705	740	759	771	801	819	878	915	
Physics .....	167	183	292	367	551	740	786	842	881	921	940	956	989	987	1,051	1,077	1,142	
Other .....	23	30	55	75	80	122	117	147	176	191	191	193	191	193	204	226	153	
Mathematics .....	37	42	78	96	128	199	215	222	230	248	272	282	279	288	289	310	313	
Computer sciences .....	36	45	98	164	281	408	473	515	554	555	608	646	682	690	709	746	860	
Environmental sciences .....	209	289	453	558	705	894	1,003	1,068	1,117	1,242	1,319	1,396	1,433	1,488	1,523	1,623	1,690	
Atmospheric sciences .....	NA	NA	NA	87	108	138	165	173	175	194	210	203	208	224	237	269	288	
Earth sciences .....	NA	NA	NA	195	254	294	324	354	384	413	417	455	456	445	449	512	544	
Ocean sciences .....	NA	NA	NA	198	258	333	359	377	390	427	458	455	473	533	537	546	602	
Other .....	209	289	453	78	86	128	156	163	169	207	234	283	295	285	301	296	256	
Life sciences .....	1,530	2,102	2,834	4,014	5,279	7,257	8,061	8,726	9,472	10,196	10,851	11,465	12,185	12,712	13,586	14,583	15,591	
Agricultural sciences...	277	413	599	864	999	1,176	1,282	1,349	1,458	1,512	1,558	1,661	1,814	1,910	1,966	1,995	2,031	
Biological sciences ....	557	711	912	1,287	1,781	2,408	2,640	2,859	3,064	3,304	3,536	3,708	3,833	3,908	4,179	4,573	5,013	
Medical sciences .....	646	897	1,247	1,739	2,318	3,377	3,819	4,154	4,546	4,964	5,324	5,639	6,070	6,391	6,908	7,466	7,991	
Other .....	51	81	76	123	181	296	321	363	404	417	433	457	468	503	534	549	557	
Psychology .....	74	78	100	130	158	213	234	253	283	329	350	358	370	381	396	445	465	
Social sciences .....	231	262	293	354	383	552	633	703	750	815	896	953	1,018	1,096	1,119	1,130	1,262	
Economics .....	48	65	83	95	118	163	187	201	209	222	231	243	250	271	259	261	270	
Political science .....	26	28	45	60	59	87	103	115	125	142	151	161	173	180	175	175	201	
Sociology .....	62	66	73	80	75	108	119	132	156	163	183	196	215	230	255	252	270	
Other .....	96	102	92	119	131	194	224	255	260	288	331	354	380	415	429	442	521	
Other sciences .....	106	101	133	156	186	290	318	336	332	315	368	389	426	418	507	448	452	
<b>Total engineering</b> .....	333	432	776	1,028	1,418	2,096	2,392	2,657	2,907	3,062	3,156	3,355	3,515	3,707	3,847	4,069	4,257	
Aeronautical/astrophysical .....	NA	NA	NA	62	81	123	148	164	180	197	213	217	241	233	247	250	260	
Bioengineering/biomedical .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	77	102	137	
Chemical .....	NA	NA	NA	89	116	163	194	218	244	261	274	279	297	317	317	327	350	
Civil .....	NA	NA	NA	116	153	224	245	284	315	340	371	403	431	455	472	495	529	
Electrical/electronic .....	NA	NA	NA	218	337	509	595	663	679	704	698	745	819	888	951	1,042	1,020	
Mechanical .....	NA	NA	NA	143	208	304	343	391	421	451	483	502	521	519	517	568	625	
Materials .....	NA	NA	NA	NA	NA	NA	NA	274	304	294	299	310	330	349	389	391	385	
Other .....	333	432	776	399	523	774	867	663	764	817	818	899	877	946	878	894	951	

See explanatory notes, if any, and SOURCE at end of tables.

Appendix table 5-9.  
**Expenditures for academic R&D, by field: 1973–99**

Field	1973	1976	1979	1982	1985	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>Millions of constant 1996 dollars<sup>a</sup></b>																	
<b>Total S&amp;E</b>	8,583	8,816	10,270	11,055	13,146	16,785	17,985	18,825	19,612	20,490	21,213	21,893	22,591	23,035	23,873	25,031	26,238
<b>Total sciences</b>	7,592	7,795	8,786	9,503	11,222	14,171	15,112	15,754	16,370	17,155	17,857	18,399	19,008	19,328	20,099	21,089	22,174
Physical sciences	977	897	1,152	1,244	1,558	1,938	1,978	2,089	2,162	2,238	2,265	2,266	2,298	2,256	2,316	2,405	2,481
Astronomy	72	62	93	110	130	158	165	197	235	259	275	278	309	276	282	293	372
Chemistry	338	331	395	466	572	705	728	749	748	767	787	791	785	801	804	850	873
Physics	497	433	560	554	748	922	944	973	983	1,003	1,000	996	1,008	987	1,031	1,044	1,090
Other	70	71	105	114	108	153	141	170	196	208	203	201	195	193	200	219	146
Mathematics	110	100	149	146	173	248	258	256	257	270	289	293	284	288	284	300	298
Computer sciences	106	105	187	247	381	509	568	595	618	605	646	673	695	690	695	723	821
Environmental sciences	623	682	867	842	957	1,114	1,205	1,234	1,246	1,352	1,402	1,454	1,461	1,488	1,494	1,573	1,613
Atmospheric sciences	NA	NA	NA	131	147	172	198	200	195	211	224	212	212	224	232	261	275
Earth sciences	NA	NA	NA	294	344	367	389	410	429	450	443	474	465	445	440	496	519
Ocean sciences	NA	NA	NA	299	350	415	431	436	435	465	487	474	482	533	526	529	574
Other	623	682	867	118	116	160	187	188	188	226	249	295	301	285	295	287	244
Life sciences	4,553	4,969	5,423	6,058	7,164	9,048	9,680	10,086	10,564	11,102	11,538	11,942	12,421	12,712	13,326	14,128	14,881
Agricultural sciences	824	976	1,145	1,305	1,356	1,466	1,540	1,560	1,627	1,646	1,657	1,730	1,849	1,910	1,928	1,933	1,939
Biological sciences	1,657	1,680	1,746	1,943	2,417	3,002	3,170	3,305	3,417	3,598	3,760	3,862	3,907	3,908	4,099	4,430	4,784
Medical sciences	1,922	2,121	2,386	2,625	3,146	4,210	4,586	4,802	5,071	5,405	5,661	5,873	6,188	6,391	6,776	7,233	7,627
Other	150	191	146	186	245	369	385	420	450	454	460	476	477	503	524	532	531
Psychology	219	184	191	197	215	266	281	292	316	358	372	373	378	381	388	431	444
Social sciences	688	620	561	534	520	688	761	813	836	888	953	993	1,038	1,096	1,097	1,095	1,205
Economics	142	155	160	144	160	203	224	232	233	241	246	253	255	271	254	253	258
Political science	76	67	85	91	81	108	124	133	139	155	161	167	176	180	172	170	192
Sociology	183	157	140	120	101	135	143	152	174	178	195	204	219	230	250	244	258
Other	287	242	176	179	178	242	269	295	290	314	352	369	388	415	421	428	497
Other sciences	315	238	255	235	253	361	382	388	370	343	392	405	434	418	498	434	431
<b>Total engineering</b>	991	1,021	1,484	1,552	1,924	2,613	2,873	3,071	3,242	3,335	3,355	3,494	3,583	3,707	3,774	3,942	4,063
Aeronautical/astronautical	NA	NA	NA	94	109	153	178	189	201	214	226	226	246	233	243	242	248
Bioengineering/biomedical	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	75	99	131
Chemical	NA	NA	NA	135	158	203	233	252	272	284	291	290	303	317	311	317	334
Civil	NA	NA	NA	175	208	279	294	329	351	370	395	420	439	455	463	479	505
Electrical/electronic	NA	NA	NA	330	458	635	714	766	757	766	742	776	834	888	933	1,010	973
Mechanical	NA	NA	NA	215	282	378	412	452	469	491	513	523	531	519	507	550	597
Materials	NA	NA	NA	NA	NA	NA	NA	316	339	320	318	323	336	349	381	379	367
Other	991	1,021	1,484	603	710	965	1,041	767	852	890	870	936	894	946	861	866	908

See explanatory notes, if any, and SOURCE at end of tables.

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Appendix table 5-9.  
**Expenditures for academic R&D, by field: 1973–99**

Field	1973	1976	1979	1982	1985	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
<b>Percent</b>																		
<b>Total S&amp;E</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
<b>Total sciences</b>	88.4	88.4	85.5	86.0	85.4	84.4	84.0	83.7	83.5	83.7	84.2	84.0	84.1	83.9	84.2	84.3	84.5	
Physical sciences	11.4	10.2	11.2	11.3	11.9	11.5	11.0	11.1	11.0	10.9	10.7	10.4	10.2	9.8	9.7	9.6	9.5	
Astronomy	0.8	0.7	0.9	1.0	1.0	0.9	0.9	1.0	1.2	1.3	1.3	1.3	1.4	1.2	1.2	1.2	1.4	
Chemistry	3.9	3.8	3.8	4.2	4.4	4.2	4.0	4.0	3.8	3.7	3.7	3.6	3.5	3.5	3.4	3.4	3.3	
Physics	5.8	4.9	5.4	5.0	5.7	5.5	5.2	5.2	5.0	4.9	4.7	4.6	4.5	4.3	4.3	4.2	4.2	
Other	0.8	0.8	1.0	1.0	0.8	0.9	0.8	0.9	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.9	0.6	
Mathematics	1.3	1.1	1.5	1.3	1.3	1.5	1.4	1.4	1.3	1.3	1.4	1.3	1.3	1.3	1.2	1.2	1.1	
Computer sciences	1.2	1.2	1.8	2.2	2.9	3.0	3.2	3.2	3.2	3.0	3.0	3.1	3.1	3.0	2.9	2.9	3.1	
Environmental sciences	7.3	7.7	8.4	7.6	7.3	6.6	6.7	6.6	6.4	6.6	6.6	6.5	6.5	6.3	6.3	6.1		
Atmospheric sciences	NA	NA	NA	1.2	1.1	1.0	1.1	1.1	1.0	1.0	1.1	1.0	0.9	1.0	1.0	1.0	1.0	
Earth sciences	NA	NA	NA	2.7	2.6	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	1.9	1.8	2.0	2.0	
Ocean sciences	NA	NA	NA	2.7	2.7	2.5	2.4	2.3	2.2	2.3	2.3	2.2	2.1	2.3	2.2	2.1	2.2	
Other	7.3	7.7	8.4	1.1	0.9	1.0	1.0	1.0	1.0	1.1	1.2	1.3	1.3	1.2	1.2	1.1	0.9	
Life sciences	53.0	56.4	52.8	54.8	54.5	53.9	53.8	53.6	53.9	54.2	54.4	54.5	55.0	55.2	55.8	56.4	56.7	
Agricultural sciences	9.6	11.1	11.2	11.8	10.3	8.7	8.6	8.3	8.3	8.0	7.8	7.9	8.2	8.3	8.1	7.7	7.4	
Biological sciences	19.3	19.1	17.0	17.6	18.4	17.9	17.6	17.6	17.4	17.6	17.7	17.6	17.3	17.0	17.2	17.7	18.2	
Medical sciences	22.4	24.1	23.2	23.7	23.9	25.1	25.5	25.5	25.9	26.4	26.7	26.8	27.4	27.7	28.4	28.9	29.1	
Other	1.8	2.2	1.4	1.7	1.9	2.2	2.1	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.0	
Psychology	2.6	2.1	1.9	1.8	1.6	1.6	1.6	1.6	1.6	1.7	1.8	1.7	1.7	1.7	1.6	1.7	1.7	
Social sciences	8.0	7.0	5.5	4.8	4.0	4.1	4.2	4.3	4.3	4.3	4.5	4.5	4.6	4.8	4.6	4.4	4.6	
Economics	1.7	1.8	1.6	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.2	1.1	1.0	1.0	
Political science	0.9	0.8	0.8	0.8	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	
Sociology	2.1	1.8	1.4	1.1	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	
Other	3.3	2.7	1.7	1.6	1.4	1.4	1.5	1.6	1.5	1.5	1.7	1.7	1.7	1.8	1.8	1.7	1.9	
Other sciences	3.7	2.7	2.5	2.1	1.9	2.2	2.1	2.1	1.9	1.7	1.8	1.8	1.9	1.8	2.1	1.7	1.6	
<b>Total engineering</b>	11.6	11.6	14.5	14.0	14.6	15.6	16.0	16.3	16.5	16.3	15.8	16.0	15.9	16.1	15.8	15.7	15.5	
Aeronautical/astrophysical	NA	NA	NA	0.9	0.8	0.9	1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.0	1.0	1.0	0.9	
Bioengineering/biomedical	NA	0.3	0.4	0.5														
Chemical	NA	NA	NA	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.3	1.3	1.4	1.3	1.3	1.3	
Civil	NA	NA	NA	1.6	1.6	1.7	1.6	1.7	1.8	1.8	1.9	1.9	1.9	2.0	1.9	1.9	1.9	
Electrical/electronic	NA	NA	NA	3.0	3.5	3.8	4.0	4.1	3.9	3.7	3.5	3.5	3.7	3.9	3.9	4.0	3.7	
Mechanical	NA	NA	NA	1.9	2.1	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.1	2.2	2.3	
Materials	NA	NA	NA	NA	NA	NA	1.7	1.7	1.6	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.4	
Other	11.6	11.6	14.5	5.5	5.4	5.8	5.8	4.1	4.3	4.3	4.1	4.3	4.0	4.1	3.6	3.5	3.5	

NA = not available

<sup>a</sup>See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1996 dollars.SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Academic Science and Engineering R&D Expenditures: Fiscal Year 1999, Detailed Statistical Tables*, NSF 01-329 (Arlington, VA: 2001); and NSF, unpublished tabulations.

See figures 5-10 and 5-11 in Volume 1.

Appendix table 5-10.

**Federal obligations for academic R&D, by agency: 1970–2001**

Year	All agencies	National Institutes of Health <sup>a</sup>	National Science Foundation	Department of Defense	National Aeronautics and Space Administration	Department of Energy <sup>b</sup>	Department of Agriculture	All other agencies
<b>Millions of current dollars</b>								
1970 .....	1,476	518	228	216	131	100	65	217
1971 .....	1,645	603	267	211	134	94	72	264
1972 .....	1,904	756	362	217	119	85	87	277
1973 .....	1,917	761	374	204	111	83	94	289
1974 .....	2,214	1,027	389	197	99	94	95	312
1975 .....	2,411	1,077	435	203	108	132	108	348
1976 .....	2,552	1,185	437	240	119	145	120	307
1977 .....	2,905	1,311	511	273	118	188	140	364
1978 .....	3,375	1,493	537	383	127	240	186	408
1979 .....	3,889	1,880	617	438	139	260	200	355
1980 .....	4,263	2,012	685	495	158	285	216	412
1981 .....	4,466	2,101	702	573	171	300	243	376
1982 .....	4,605	2,140	715	664	186	277	255	369
1983 .....	4,966	2,392	783	724	189	297	275	306
1984 .....	5,547	2,715	880	830	204	321	261	335
1985 .....	6,340	3,158	1,002	940	237	357	293	352
1986 .....	6,559	3,243	992	1,098	254	345	274	355
1987 .....	7,337	3,903	1,096	1,017	294	386	280	361
1988 .....	7,828	4,199	1,143	1,071	338	406	305	366
1989 .....	8,672	4,565	1,254	1,189	434	454	328	449
1990 .....	9,138	4,779	1,321	1,213	471	500	348	505
1991 .....	10,169	5,521	1,436	1,152	534	621	386	520
1992 .....	10,271	5,064	1,540	1,403	586	640	438	600
1993 .....	11,208	5,848	1,562	1,616	614	583	433	553
1994 .....	11,797	6,191	1,680	1,703	641	565	439	577
1995 .....	11,928	6,271	1,734	1,589	708	594	435	597
1996 .....	11,978	6,620	1,740	1,447	665	601	376	529
1997 .....	12,559	7,057	1,819	1,345	719	583	441	595
1998 .....	13,366	7,565	1,875	1,422	787	623	415	679
1999 .....	14,959	8,762	2,076	1,474	787	630	492	739
2000 (estimated) .....	16,612	10,085	2,200	1,523	787	642	581	797
2001 (estimated) .....	17,724	10,715	2,634	1,534	787	706	502	847
<b>Millions of constant 1996 dollars<sup>c</sup></b>								
1970 .....	5,181	1,818	800	758	460	351	228	762
1971 .....	5,498	2,015	892	705	448	314	241	882
1972 .....	6,079	2,414	1,156	693	380	271	278	884
1973 .....	5,861	2,327	1,143	624	339	254	287	884
1974 .....	6,318	2,931	1,110	562	283	268	271	890
1975 .....	6,235	2,785	1,125	525	279	341	279	900
1976 .....	6,164	2,862	1,056	580	287	350	290	742
1977 .....	6,527	2,945	1,148	613	265	422	315	818
1978 .....	7,096	3,139	1,129	805	267	505	391	858
1979 .....	7,563	3,656	1,200	852	270	506	389	690
1980 .....	7,614	3,593	1,223	884	282	509	386	736
1981 .....	7,271	3,421	1,143	933	278	488	396	612
1982 .....	7,007	3,256	1,088	1,010	283	421	388	561
1983 .....	7,238	3,486	1,141	1,055	275	433	401	446
1984 .....	7,797	3,816	1,237	1,167	287	451	367	471
1985 .....	8,627	4,297	1,363	1,279	322	486	399	479
1986 .....	8,715	4,309	1,318	1,459	337	458	364	472
1987 .....	9,488	5,047	1,417	1,315	380	499	362	467
1988 .....	9,802	5,258	1,431	1,341	423	508	382	458
1989 .....	10,457	5,505	1,512	1,434	523	547	396	541
1990 .....	10,619	5,554	1,535	1,410	547	581	404	587
1991 .....	11,375	6,176	1,606	1,289	597	695	432	582
1992 .....	11,196	5,520	1,679	1,529	639	698	477	654

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-10.

**Federal obligations for academic R&D, by agency: 1970–2001**

Year	All agencies	National Institutes of Health <sup>a</sup>	National Science Foundation	Department of Defense	Administration	National Aeronautics and Space			All other agencies
						Department of Energy <sup>b</sup>	Department of Energy <sup>b</sup>	Department of Agriculture	
1993 .....	11,932	6,226	1,663	1,720	654	621	461	589	
1994 .....	12,294	6,452	1,751	1,775	668	589	457	601	
1995 .....	12,166	6,396	1,769	1,621	722	606	444	609	
1996 .....	11,978	6,620	1,740	1,447	665	601	376	529	
1997 .....	12,319	6,922	1,784	1,319	705	572	433	584	
1998 .....	12,926	7,316	1,813	1,375	761	603	401	657	
1999 .....	14,267	8,357	1,980	1,406	751	601	469	705	
2000 (estimated) .....	15,544	9,437	2,059	1,425	736	601	544	746	
2001 ((estimated)) .....	16,244	9,820	2,414	1,406	721	647	460	776	
<b>Percent</b>									
1970 .....	100.0	35.1	15.4	14.6	8.9	6.8	4.4	14.7	
1971 .....	100.0	36.7	16.2	12.8	8.1	5.7	4.4	16.0	
1972 .....	100.0	39.7	19.0	11.4	6.3	4.5	4.6	14.5	
1973 .....	100.0	39.7	19.5	10.6	5.8	4.3	4.9	15.1	
1974 .....	100.0	46.4	17.6	8.9	4.5	4.2	4.3	14.1	
1975 .....	100.0	44.7	18.0	8.4	4.5	5.5	4.5	14.4	
1976 .....	100.0	46.4	17.1	9.4	4.7	5.7	4.7	12.0	
1977 .....	100.0	45.1	17.6	9.4	4.1	6.5	4.8	12.5	
1978 .....	100.0	44.2	15.9	11.3	3.8	7.1	5.5	12.1	
1979 .....	100.0	48.3	15.9	11.3	3.6	6.7	5.1	9.1	
1980 .....	100.0	47.2	16.1	11.6	3.7	6.7	5.1	9.7	
1981 .....	100.0	47.0	15.7	12.8	3.8	6.7	5.4	8.4	
1982 .....	100.0	46.5	15.5	14.4	4.0	6.0	5.5	8.0	
1983 .....	100.0	48.2	15.8	14.6	3.8	6.0	5.5	6.2	
1984 .....	100.0	48.9	15.9	15.0	3.7	5.8	4.7	6.0	
1985 .....	100.0	49.8	15.8	14.8	3.7	5.6	4.6	5.6	
1986 .....	100.0	49.4	15.1	16.7	3.9	5.3	4.2	5.4	
1987 .....	100.0	53.2	14.9	13.9	4.0	5.3	3.8	4.9	
1988 .....	100.0	53.6	14.6	13.7	4.3	5.2	3.9	4.7	
1989 .....	100.0	52.6	14.5	13.7	5.0	5.2	3.8	5.2	
1990 .....	100.0	52.3	14.5	13.3	5.2	5.5	3.8	5.5	
1991 .....	100.0	54.3	14.1	11.3	5.3	6.1	3.8	5.1	
1992 .....	100.0	49.3	15.0	13.7	5.7	6.2	4.3	5.8	
1993 .....	100.0	52.2	13.9	14.4	5.5	5.2	3.9	4.9	
1994 .....	100.0	52.5	14.2	14.4	5.4	4.8	3.7	4.9	
1995 .....	100.0	52.6	14.5	13.3	5.9	5.0	3.6	5.0	
1996 .....	100.0	55.3	14.5	12.1	5.6	5.0	3.1	4.4	
1997 .....	100.0	56.2	14.5	10.7	5.7	4.6	3.5	4.7	
1998 .....	100.0	56.6	14.0	10.6	5.9	4.7	3.1	5.1	
1999 .....	100.0	58.6	13.9	9.9	5.3	4.2	3.3	4.9	
2000 (estimated) .....	100.0	60.7	13.2	9.2	4.7	3.9	3.5	4.8	
2001 (estimated) .....	100.0	60.5	14.9	8.7	4.4	4.0	2.8	4.8	

<sup>a</sup>Data for the National Institutes of Health include the Alcohol, Drug Abuse, and Mental Health Administration.

<sup>b</sup>Data for 1970–73 are for the Atomic Energy Commission; data for 1974–76 are for the Energy Research and Development Administration; data for 1977 and thereafter are for the Department of Energy.

<sup>c</sup>See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1996 dollars.

NOTE: Percentages may not total 100 because of rounding.

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Federal Funds for Research and Development: Fiscal Years 1999, 2000, and 2001*, Detailed Statistical Tables, Vol. 49, NSF 01-328 (Arlington, VA, 2001); and NSF, annual series.

Appendix table 5-11.  
**Federal obligations for academic research, by agency: 1970–2001**

Year	All agencies	National Institutes of Health <sup>a</sup>	National Science Foundation	Department of Defense	National Aeronautics and Space Administration	Department of Energy <sup>b</sup>	Department of Agriculture	All other agencies
		<b>Millions of current dollars</b>						
1970 .....	1,276	480	223	173	65	97	65	174
1971 .....	1,430	551	254	184	70	90	72	210
1972 .....	1,643	677	346	177	48	81	87	226
1973 .....	1,691	749	370	161	80	79	94	158
1974 .....	1,958	1,004	369	167	85	86	94	153
1975 .....	2,079	1,036	420	165	91	112	108	148
1976 .....	2,250	1,138	429	192	98	116	119	158
1977 .....	2,584	1,269	505	221	105	134	139	211
1978 .....	2,928	1,437	534	243	116	175	181	241
1979 .....	3,333	1,657	612	271	125	204	198	266
1980 .....	3,699	1,835	680	313	146	224	214	287
1981 .....	3,920	1,929	698	363	157	248	240	284
1982 .....	4,045	1,995	713	413	156	236	253	280
1983 .....	4,468	2,246	783	472	170	273	273	250
1984 .....	5,030	2,573	880	539	177	311	260	290
1985 .....	5,726	2,990	1,002	587	213	336	292	305
1986 .....	5,883	3,054	992	707	225	334	273	298
1987 .....	6,640	3,651	1,096	681	263	372	279	298
1988 .....	7,023	3,856	1,143	729	310	384	304	297
1989 .....	7,793	4,167	1,254	840	387	437	326	382
1990 .....	8,137	4,349	1,321	795	422	479	346	426
1991 .....	8,868	4,729	1,436	794	474	596	384	456
1992 .....	9,061	4,517	1,540	912	512	605	436	538
1993 .....	9,892	5,253	1,562	1,090	539	547	429	472
1994 .....	10,292	5,517	1,680	1,079	555	529	436	496
1995 .....	10,354	5,481	1,734	1,047	588	558	431	516
1996 .....	10,707	5,924	1,740	1,071	560	566	373	471
1997 .....	11,173	6,309	1,819	945	596	552	437	515
1998 .....	11,741	6,716	1,875	965	648	564	408	566
1999 .....	13,204	7,733	2,076	989	745	562	482	617
2000 (estimated) .....	14,699	8,866	2,200	1,064	745	572	573	680
2001 (estimated) .....	15,696	9,372	2,634	1,117	745	623	495	711
<b>Millions of constant 1996 dollars<sup>c</sup></b>								
1970 .....	4,480	1,686	784	606	230	339	227	609
1971 .....	4,780	1,840	848	615	235	300	240	703
1972 .....	5,245	2,162	1,105	564	154	259	279	722
1973 .....	5,170	2,289	1,132	491	246	241	288	483
1974 .....	5,589	2,866	1,053	477	242	244	269	437
1975 .....	5,376	2,678	1,086	427	235	290	278	383
1976 .....	5,434	2,749	1,036	463	236	281	288	382
1977 .....	5,804	2,850	1,134	496	236	301	312	475
1978 .....	6,157	3,022	1,123	510	245	367	381	508
1979 .....	6,483	3,223	1,191	527	244	396	385	517
1980 .....	6,607	3,277	1,215	558	261	400	383	512
1981 .....	6,383	3,141	1,136	591	256	404	391	463
1982 .....	6,156	3,035	1,085	628	237	359	385	427
1983 .....	6,512	3,274	1,141	688	247	398	398	365
1984 .....	7,070	3,617	1,237	757	249	438	365	408
1985 .....	7,792	4,069	1,363	799	290	457	398	416
1986 .....	7,817	4,058	1,318	940	299	444	363	397
1987 .....	8,587	4,721	1,418	881	340	481	361	386
1988 .....	8,794	4,829	1,432	913	388	481	381	371
1989 .....	9,397	5,024	1,512	1,013	467	527	393	461
1990 .....	9,456	5,054	1,535	924	490	557	402	495
1991 .....	9,919	5,290	1,606	888	531	666	429	510
1992 .....	9,876	4,924	1,679	994	558	660	475	586

See explanatory notes, if any, and SOURCE at end of table.

**Appendix table 5-11.**  
**Federal obligations for academic research, by agency: 1970–2001**

Year	All agencies	National Institutes of Health <sup>a</sup>	National Science Foundation	Department of Defense	National Aeronautics and Space Administration	Department of Energy <sup>b</sup>	Department of Agriculture	All other agencies
		Percent						
1993 .....	10,532	5,592	1,663	1,161	574	583	457	503
1994 .....	10,725	5,750	1,751	1,124	579	551	454	517
1995 .....	10,561	5,590	1,768	1,068	599	569	440	526
1996 .....	10,707	5,924	1,740	1,071	560	566	373	471
1997 .....	10,960	6,188	1,784	927	585	542	428	505
1998 .....	11,355	6,495	1,813	933	626	545	395	548
1999 .....	12,593	7,376	1,980	943	710	536	459	589
2000 (estimated) .....	13,754	8,296	2,058	996	697	535	536	636
2001 (estimated) .....	14,386	8,589	2,414	1,023	683	571	454	652

  

Year	100.0	37.6	17.5	13.5	5.1	7.6	5.1	13.6
1970 .....	100.0	38.5	17.7	12.9	4.9	6.3	5.0	14.7
1971 .....	100.0	41.2	21.1	10.8	2.9	4.9	5.3	13.8
1972 .....	100.0	44.3	21.9	9.5	4.8	4.7	5.6	9.3
1973 .....	100.0	51.3	18.8	8.5	4.3	4.4	4.8	7.8
1975 .....	100.0	49.8	20.2	7.9	4.4	5.4	5.2	7.1
1976 .....	100.0	50.6	19.1	8.5	4.3	5.2	5.3	7.0
1977 .....	100.0	49.1	19.5	8.6	4.1	5.2	5.4	8.2
1978 .....	100.0	49.1	18.2	8.3	4.0	6.0	6.2	8.2
1979 .....	100.0	49.7	18.4	8.1	3.8	6.1	5.9	8.0
1980 .....	100.0	49.6	18.4	8.5	3.9	6.1	5.8	7.8
1981 .....	100.0	49.2	17.8	9.3	4.0	6.3	6.1	7.3
1982 .....	100.0	49.3	17.6	10.2	3.9	5.8	6.3	6.9
1983 .....	100.0	50.3	17.5	10.6	3.8	6.1	6.1	5.6
1984 .....	100.0	51.2	17.5	10.7	3.5	6.2	5.2	5.8
1985 .....	100.0	52.2	17.5	10.3	3.7	5.9	5.1	5.3
1986 .....	100.0	51.9	16.9	12.0	3.8	5.7	4.6	5.1
1987 .....	100.0	55.0	16.5	10.3	4.0	5.6	4.2	4.5
1988 .....	100.0	54.9	16.3	10.4	4.4	5.5	4.3	4.2
1989 .....	100.0	53.5	16.1	10.8	5.0	5.6	4.2	4.9
1990 .....	100.0	53.4	16.2	9.8	5.2	5.9	4.2	5.2
1991 .....	100.0	53.3	16.2	9.0	5.4	6.7	4.3	5.1
1992 .....	100.0	49.9	17.0	10.1	5.6	6.7	4.8	5.9
1993 .....	100.0	53.1	15.8	11.0	5.4	5.5	4.3	4.8
1994 .....	100.0	53.6	16.3	10.5	5.4	5.1	4.2	4.8
1995 .....	100.0	52.9	16.7	10.1	5.7	5.4	4.2	5.0
1996 .....	100.0	55.3	16.3	10.0	5.2	5.3	3.5	4.4
1997 .....	100.0	56.5	16.3	8.5	5.3	4.9	3.9	4.6
1998 .....	100.0	57.2	16.0	8.2	5.5	4.8	3.5	4.6
1999 .....	100.0	58.6	15.7	7.5	5.6	4.3	3.6	4.7
2000 (estimated) .....	100.0	60.3	15.0	7.2	5.1	3.9	3.9	4.6
2001 (estimated) .....	100.0	59.7	16.8	7.1	4.7	4.0	3.2	4.5

<sup>a</sup>Data for the National Institutes of Health include the Alcohol, Drug Abuse, and Mental Health Administration.

<sup>b</sup>Data for 1970–73 are for the Atomic Energy Commission; data for 1974–76 are for the Energy Research and Development Administration; data for 1977 and thereafter are for the Department of Energy.

<sup>c</sup>See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1996 dollars.

NOTE: Percentages may not total 100 because of rounding.

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Federal Funds for Research and Development: Fiscal Years 1999, 2000, and 2001*, Detailed Statistical Tables, Vol. 49, NSF 01-328 (Arlington, VA, 2001); and NSF, annual series.

Appendix table 5-12.

**Distribution of Federal agency academic research obligations, by field: FY 1999**  
(Percentages)

Field	National Science Foundation	National Aeronautics and Space Administration	Department of Defense	Department of Energy	Department of Health and Human Services	Department of Agriculture
<b>Total S&amp;E</b>	100.0	100.0	100.0	100.0	100.0	100.0
<b>Total sciences</b>	81.6	83.3	59.8	87.9	99.3	96.6
Physical sciences	21.1	41.9	10.5	58.9	1.5	4.7
Astronomy	2.0	20.7	0.2	0.0	0.0	0.0
Chemistry	6.9	2.1	3.7	9.1	1.4	4.6
Physics	8.1	15.7	6.0	49.7	0.1	0.0
Other	4.1	3.4	0.6	0.1	0.0	0.0
Mathematics	4.1	0.2	2.1	2.5	0.1	0.1
Computer sciences	13.4	3.8	20.6	0.6	0.2	0.0
Environmental sciences	16.1	24.6	8.9	12.1	0.3	0.4
Atmospheric sciences	3.6	12.2	1.4	3.8	0.0	0.4
Earth sciences	4.3	3.3	0.2	5.0	0.0	0.0
Ocean sciences	7.7	1.1	7.0	0.5	0.0	0.0
Other	0.5	7.9	0.2	2.8	0.3	0.0
Life sciences	17.6	7.6	15.7	13.2	88.9	81.6
Agricultural sciences	0.0	0.1	0.0	0.0	0.0	42.0
Biology (excluding environmental)	12.9	3.2	6.3	9.1	47.8	19.7
Environmental biology	4.7	0.2	0.8	0.0	0.0	18.3
Medical sciences	0.0	0.7	7.0	4.1	38.3	1.7
Other	0.0	3.5	1.5	0.0	2.8	0.0
Psychology	0.2	1.0	0.3	0.0	3.9	0.0
Biological aspects	0.0	0.0	0.2	0.0	0.2	0.0
Social aspects	0.2	0.3	0.0	0.0	0.1	0.0
Other	0.0	0.7	0.1	0.0	3.7	0.0
Social sciences	4.6	0.0	0.0	0.0	1.1	9.9
Anthropology	0.5	0.0	0.0	0.0	0.0	0.0
Economics	0.6	0.0	0.0	0.0	0.0	7.9
Political science	0.3	0.0	0.0	0.0	0.0	0.0
Sociology	0.2	0.0	0.0	0.0	0.0	2.0
Other	3.0	0.0	0.0	0.0	1.1	0.0
Other sciences	4.5	4.0	1.7	0.5	3.3	0.0
<b>Total engineering</b>	18.4	16.7	40.2	12.1	0.7	3.4
Aeronautical	0.0	5.3	3.3	0.0	0.0	0.0
Astronautical	0.0	5.3	0.1	0.0	0.0	0.0
Chemical	2.0	0.2	1.3	3.3	0.0	0.1
Civil	1.8	0.0	0.2	0.8	0.0	0.0
Electrical	2.2	1.2	13.6	0.5	0.0	0.0
Mechanical	0.3	1.4	5.2	1.6	0.0	0.0
Materials	5.4	2.1	9.9	2.9	0.0	0.0
Other	6.6	1.2	6.6	2.9	0.7	3.3

NOTES: Academic research includes both basic and applied research. The six agencies shown are the only ones that report their research obligations to academia by S&E field; they represent approximately 97 percent of academic research obligations.

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Federal Funds for Research and Development: Fiscal Years 1999, 2000, and 2001*, Detailed Statistical Tables, Vol. 49, NSF 01-328 (Arlington, VA, 2001); and NSF, annual series.

See figure 5-12 in Volume 1.

Science & Engineering Indicators – 2002

Appendix table 5-13.

**Federal academic research obligations provided by major agencies, by field: FY 1999**  
 (Percentages)

Field	Six-agency total	National Science Foundation	National Aeronautics and Space Administration	Department of Defense	Department of Energy	Department of Health and Human Services	Department of Agriculture
<b>Total S&amp;E</b>	100.0	16.3	5.8	7.7	4.4	62.0	3.8
<b>Total sciences</b>	100.0	14.4	5.3	5.0	4.2	67.0	4.0
Physical sciences	100.0	33.1	23.6	7.8	25.0	8.8	1.7
Astronomy	100.0	20.7	78.2	1.1	0.0	0.0	0.0
Chemistry	100.0	37.4	4.1	9.6	13.5	29.6	5.9
Physics	100.0	26.9	18.6	9.4	44.4	0.6	0.0
Other	100.0	73.0	21.6	5.0	0.4	0.0	0.0
Mathematics	100.0	63.8	1.0	15.3	10.7	8.9	0.2
Computer sciences	100.0	52.9	5.4	38.7	0.6	2.5	0.0
Environmental sciences	100.0	48.1	26.3	12.6	9.8	3.0	0.3
Atmospheric sciences	100.0	36.8	45.0	6.8	10.4	0.0	0.9
Earth sciences	100.0	61.8	16.9	1.7	19.5	0.0	0.1
Ocean sciences	100.0	66.4	3.5	28.8	1.2	0.0	0.0
Other	100.0	10.4	54.0	1.9	14.5	19.2	0.0
Life sciences	100.0	4.5	0.7	1.9	0.9	87.1	4.9
Agricultural sciences	100.0	0.0	0.3	0.0	0.0	0.0	99.7
Biology (excluding environmental)	100.0	6.2	0.6	1.5	1.2	88.3	2.2
Environmental biology	100.0	50.0	0.7	4.1	0.0	0.0	45.1
Medical sciences	100.0	0.0	0.2	2.2	0.7	96.6	0.3
Other	100.0	0.0	9.8	5.7	0.1	84.5	0.0
Psychology	100.0	1.3	2.3	1.0	0.0	95.4	0.0
Biological aspects	100.0	0.0	0.5	16.1	0.0	83.4	0.0
Social aspects	100.0	35.7	21.3	0.0	0.0	43.0	0.0
Other	100.0	0.0	1.6	0.4	0.0	98.0	0.0
Social sciences	100.0	41.7	0.1	0.0	0.0	37.6	20.5
Anthropology	100.0	100.0	0.0	0.0	0.0	0.0	0.0
Economics	100.0	25.3	0.0	0.0	0.0	1.8	72.8
Political science	100.0	100.0	0.0	0.0	0.0	0.0	0.0
Sociology	100.0	26.6	1.3	0.0	0.0	6.9	65.1
Other	100.0	42.5	0.1	0.0	0.0	57.4	0.0
Other sciences	100.0	23.2	7.5	4.1	0.7	64.4	0.0
<b>Total engineering</b>	100.0	36.5	11.9	38.0	6.5	5.5	1.6
Aeronautical	100.0	0.0	54.8	45.2	0.0	0.0	0.0
Astronautical	100.0	0.0	96.5	3.5	0.0	0.0	0.0
Chemical	100.0	55.0	2.3	17.3	25.0	0.0	0.5
Civil	100.0	85.2	0.3	3.7	10.6	0.0	0.2
Electrical	100.0	23.9	4.6	70.0	1.6	0.0	0.0
Mechanical	100.0	9.0	13.0	66.0	11.9	0.0	0.1
Materials	100.0	46.3	6.6	40.5	6.6	0.0	0.0
Other	100.0	45.7	3.0	21.5	5.4	19.2	5.2

NOTES: Academic research includes both basic and applied research. The six agencies shown are the only ones that report their research obligations to academia by S&E field; they represent approximately 97 percent of academic research obligations.

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Federal Funds for Research and Development: Fiscal Years 1999, 2000, and 2001*, Detailed Statistical Tables, Vol. 49, NSF 01-328 (Arlington, VA, 2001); and NSF, annual series.

See figure 5-13 in Volume 1.

Science & Engineering Indicators – 2002

Appendix table 5-14.

**Number of academic institutions receiving Federal R&D support, by selected Carnegie classification: 1971–99**

Year	All academic institutions	Carnegie research and doctorate-granting institutions	Other Carnegie institutions
1971 .....	563	222	341
1972 .....	618	223	395
1973 .....	534	219	315
1974 .....	547	217	330
1975 .....	556	221	335
1976 .....	572	222	350
1977 .....	618	220	398
1978 .....	675	221	454
1979 .....	665	223	442
1980 .....	684	223	461
1981 .....	621	225	396
1982 .....	589	223	366
1983 .....	602	226	376
1984 .....	603	225	378
1985 .....	648	226	422
1986 .....	650	225	425
1987 .....	738	228	510
1988 .....	683	228	455
1989 .....	712	229	483
1990 .....	748	228	520
1991 .....	775	227	548
1992 .....	837	228	609
1993 .....	889	227	662
1994 .....	903	227	676
1995 .....	891	228	663
1996 .....	836	228	608
1997 .....	832	228	604
1998 .....	794	230	564
1999 .....	787	228	559

NOTES: See chapter 2, "Classification of Academic Institutions," for information on the institutional categories used by the Carnegie Foundation for the Advancement of Teaching. "Other Carnegie institutions" are all Carnegie-classified institutions except research and doctorate-granting institutions.

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year 1999*, Detailed Statistical Tables, NSF 01-323 (Arlington, VA, 2001); and NSF, annual series.

See figure 5-14 in Volume 1.

Science & Engineering Indicators – 2002

Appendix table 5-15.

**Academic research space, new construction, and repaired/renovated space, by field: 1986–2001**  
(Millions of square feet)

Field	Total research space							
	1988	1990	1992	1994	1996	1998	1999	
<b>Total, all fields</b> .....	112	116	122	127	136	143	151	
Physical sciences .....	16	16	16	17	18	18	19	
Mathematics .....	1	1	1	1	1	1	1	
Computer sciences .....	1	1	2	2	2	2	2	
Earth, atmospheric, and ocean sciences .....	6	6	7	7	7	8	8	
Agricultural sciences .....	18	21	20	20	22	25	25	
Biological sciences								
Universities and colleges .....	16	18	17	17	19	19	19	
Medical schools .....	8	9	11	11	11	12	13	
Medical sciences								
Universities and colleges .....	5	5	6	6	7	7	8	
Medical schools .....	14	15	16	17	18	18	19	
Psychology .....	3	3	3	3	3	3	4	
Social sciences .....	3	3	3	3	4	5	5	
Other sciences (n.e.c.) .....	4	2	2	2	2	3	3	
Engineering .....	16	17	18	21	22	23	26	
New construction								
	1986–87	1988–89	1990–91	1992–93	1994–95	1996–97	1998–99	2000–01 <sup>a</sup>
<b>Total, all fields</b> .....	9.9	10.6	11.4	11.0	9.5	11.1	8.8	16.1
Physical sciences .....	0.8	2.0	1.6	1.3	1.6	1.2	1.1	1.1
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences .....	0.2	0.3	0.3	0.2	0.1	0.1	0.3	0.5
Earth, atmospheric, and ocean sciences .....	0.4	0.3	0.5	0.5	0.3	0.5	0.3	0.6
Agricultural sciences .....	1.5	1.1	1.0	1.2	0.8	1.5	0.8	1.0
Biological sciences								
Universities and colleges .....	1.3	1.5	1.4	1.2	1.0	1.2	1.0	2.2
Medical schools .....	0.4	0.7	1.4	1.0	0.6	0.7	1.0	2.8
Medical sciences								
Universities and colleges .....	0.6	0.3	0.7	0.7	0.4	0.7	0.8	1.6
Medical schools .....	1.3	1.9	2.3	3.2	1.7	2.7	1.3	2.6
Psychology .....	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.4
Social sciences .....	0.2	0.3	b	0.2	0.4	0.2	0.1	0.2
Other sciences (n.e.c.) .....	0.6	0.4	0.4	0.4	0.3	0.5	0.5	0.6
Engineering .....	2.4	1.5	1.7	1.1	2.2	1.5	1.5	2.5
Repaired/renovated space								
	1986–87	1988–89	1990–91	1992–93	1994–95	1996–97	1998–99	2000–01 <sup>a</sup>
<b>Total, all fields</b> .....	13.4	11.4	8.6	9.1	13.1	15.1	16.4	12.5
Physical sciences .....	1.7	1.9	1.7	1.7	2.5	2.4	2.1	1.8
Mathematics .....	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.3
Computer sciences .....	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.1
Earth, atmospheric, and ocean sciences .....	0.4	0.9	0.5	0.4	0.5	0.4	0.9	0.5
Agricultural sciences .....	0.6	0.5	0.4	0.3	1.2	0.8	0.6	0.4
Biological sciences								
Universities and colleges .....	2.6	2.2	1.1	1.3	1.6	2.5	2.0	1.8
Medical schools .....	1.1	1.3	1.3	0.9	0.8	1.5	2.3	2.0
Medical sciences								
Universities and colleges .....	0.7	0.7	0.6	0.3	0.8	0.7	1.1	0.8
Medical schools .....	2.5	1.6	1.4	1.7	3.1	2.2	1.6	2.3
Psychology .....	0.3	0.1	0.3	0.1	0.2	0.5	0.6	0.4
Social sciences .....	0.2	0.1	b	0.2	0.3	0.7	0.8	0.6
Other sciences (n.e.c.) .....	0.5	0.2	0.0	0.2	0.2	0.4	1.2	0.2
Engineering .....	2.7	1.6	1.2	1.9	1.8	2.7	2.6	1.3

n.e.c. = not elsewhere classified

<sup>a</sup>New construction and repair/renovation planned to start in FY 2000 or FY 2001, the two-year period after the survey year.<sup>b</sup>Data included with psychology.

NOTES: For new construction and repair/renovation, data for two years are combined; e.g., 1988–89 refers to two fiscal years. Total research space is current actual space reported at the time of the survey. Square footage refers to net assignable square feet (the sum of all areas on all floors of a building assigned to or available to be assigned to an occupant for specific use, such as instruction or research). Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Scientific and Engineering Research Facilities at Universities and Colleges, various years.

See figure 5-15 in Volume 1.

Science &amp; Engineering Indicators – 2002

Appendix table 5-16.

**Cost of new construction and repair/renovation of academic research facilities, by field: 1986–2001**  
 (Millions of current dollars)

Field	1986–87	1988–89	1990–91	1992–93	1994–95	1996–97	1998–99		2000–01
	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Planned	Planned
<b>New construction</b>									
<b>Total, all fields .....</b>	2,051	2,464	2,976	2,812	2,768	3,110	2,882	3,949	7,447
Physical sciences.....	182	401	430	337	426	381	419	525	549
Mathematics .....	2	8	12	10	2	9	11	19	13
Computer sciences .....	61	65	40	47	46	21	69	27	169
Earth, atmospheric, and ocean sciences.....	57	82	170	123	33	172	116	235	201
Agricultural sciences .....	150	152	175	210	150	273	156	169	233
Biological sciences									
Universities and colleges .....	324	396	451	292	388	404	389	812	1,027
Medical schools .....	139	181	381	341	226	178	294	597	1,503
Medical sciences									
Universities and colleges .....	203	61	151	160	122	259	337	206	1,215
Medical schools .....	302	587	655	839	525	784	511	613	1,256
Psychology .....	23	25	36	16	42	77	50	91	169
Social sciences .....	38	48	<sup>a</sup>	44	112	75	46	81	71
Other sciences (n.e.c.) .....	139	70	79	106	122	145	130	46	270
Engineering .....	430	388	395	286	575	332	354	528	771
<b>Repair/renovation</b>									
<b>Total, all fields .....</b>	838	1,010	826	837	1,058	1,325	1,693	1,580	2,000
Physical sciences .....	105	165	151	134	192	244	216	241	328
Mathematics .....	4	11	6	2	6	5	17	51	30
Computer sciences .....	17	9	21	4	8	12	19	95	22
Earth, atmospheric, and ocean sciences.....	21	18	16	31	35	52	82	54	42
Agricultural sciences .....	20	23	35	14	72	50	23	26	27
Biological sciences									
Universities and colleges .....	146	126	135	108	127	200	256	280	260
Medical schools .....	78	76	123	116	101	164	233	93	337
Medical sciences									
Universities and colleges .....	52	24	53	28	59	76	109	77	107
Medical schools .....	174	161	166	234	226	196	241	282	600
Psychology .....	14	11	31	10	28	65	30	33	49
Social sciences .....	36	8	<sup>a</sup>	10	40	40	101	124	64
Other sciences (n.e.c.) .....	30	17	6	7	12	11	64	24	26
Engineering .....	141	361	82	139	150	208	301	198	107

n.e.c. = not elsewhere classified

<sup>a</sup>Data included with psychology.

NOTES: Project cost estimates are prorated to reflect research component only. Data for two years are combined, e.g., 1988–89 refers to two fiscal years. Costs refer to the entire completion costs of projects begun in the two fiscal years. Actual cost data are provided in the survey year and planned costs are provided for the two-year period after the survey year.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Scientific and Engineering Research Facilities at Universities and Colleges, various years.

Appendix table 5-17.

**Funds for new construction and repair/renovation of S&E research space, by type of institution and funding source:****1986–99**

(Millions of current dollars)

Institution type and funding source	1986–87	1988–89	1990–91	1992–93	1994–95	1996–97	1998–99 <sup>a</sup>
<b>Total new construction and repair/renovation</b>							
<b>All institutions</b>	2,888.5	3,474.0	3,801.3	3,646.2	3,825.7	4,434.8	4,231.4
Federal Government	172.7	413.1	525.3	515.5	317.2	391.7	264.2
State and local government	1,012.2	1,124.5	1,199.6	1,220.4	1,446.3	1,304.7	1,258.5
Private donations	588.5	511.3	453.2	374.0	470.7	737.2	593.8
Institutional funds <sup>b</sup>	617.8	914.6	749.5	706.3	874.7	1,171.7	1,203.4
Tax-exempt bonds	450.7	390.1	793.9	701.3	476.5	637.6	732.2
Other debt	6.9	111.8	43.4	66.0	224.3	142.3	134.4
Other	39.3	6.0	36.3	66.2	15.8	49.6	45.0
<b>Public institutions</b>	1,790.7	2,425.5	2,469.3	2,536.8	2,368.1	2,658.3	2,507.8
Federal Government	53.5	305.7	412.7	360.1	154.3	273.4	222.2
State and local government	981.1	1,067.7	1,042.9	1,166.9	1,419.0	1,268.5	1,096.6
Private donations	274.1	214.9	182.9	177.4	139.9	305.6	239.8
Institutional funds <sup>b</sup>	264.3	659.8	404.8	352.7	303.2	428.9	611.3
Tax-exempt bonds	215.0	161.1	410.7	446.4	324.4	284.8	272.7
Other debt	2.7	13.0	7.8	17.8	14.4	54.7	32.8
Other	0.4	0.6	7.5	15.2	13.0	42.6	32.5
<b>Private institutions</b>	1,097.8	1,048.5	1,332.0	1,110.1	1,457.5	1,776.5	1,723.6
Federal Government	119.2	107.4	112.6	155.3	162.8	118.3	42.1
State and local government	31.1	56.8	156.7	53.8	27.5	36.2	162.0
Private donations	314.4	296.4	270.3	196.0	330.9	431.8	354.0
Institutional funds <sup>b</sup>	353.5	254.8	344.7	352.4	571.4	742.8	592.2
Tax-exempt bonds	235.7	229.0	383.2	254.1	152.2	352.9	459.4
Other debt	4.2	98.8	35.6	47.9	209.9	87.6	101.5
Other	38.9	5.4	28.8	50.7	2.8	7.0	12.4
<b>New construction</b>							
<b>All institutions</b>	2,050.6	2,464.5	2,975.6	2,810.8	2,767.6	3,110.3	2,545.5
Federal Government	145.4	352.0	476.3	459.3	206.5	270.9	198.6
State and local government	779.1	890.7	956.6	968.0	1,180.8	966.6	814.5
Private donations	487.5	459.2	352.6	301.0	360.0	596.6	390.2
Institutional funds <sup>b</sup>	289.8	343.8	394.1	374.3	442.0	593.1	558.2
Tax-exempt bonds	313.1	320.2	727.5	620.3	426.1	553.0	492.2
Other debt	3.1	95.9	35.4	39.0	145.7	106.6	60.7
Other	31.9	0.8	33.1	50.0	6.5	23.5	31.2
<b>Public institutions</b>	1,354.8	1,727.0	2,020.0	2,016.4	1,872.3	1,988.7	1,536.1
Federal Government	40.3	274.3	388.1	325.8	115.4	201.0	171.7
State and local government	754.5	838.4	809.4	929.8	1,164.6	940.2	656.5
Private donations	259.1	192.9	139.1	152.5	123.9	267.3	172.4
Institutional funds <sup>b</sup>	109.2	256.3	270.2	198.3	142.4	249.3	250.8
Tax-exempt bonds	189.5	154.5	398.6	390.5	306.1	259.7	222.0
Other debt	2.4	8.1	7.8	16.2	13.5	54.4	32.7
Other	0.2	0.6	6.9	3.3	6.5	16.9	30.0
<b>Private institutions</b>	695.8	737.5	955.6	795.5	895.2	1,121.6	1,009.4
Federal Government	105.1	77.7	88.2	133.5	91.0	69.9	27.0
State and local government	24.6	52.3	147.2	38.8	16.3	26.4	158.0
Private donations	228.4	266.3	213.5	148.5	236.1	329.4	217.8
Institutional funds <sup>b</sup>	180.6	87.5	123.9	176.1	299.5	343.8	307.4
Tax-exempt bonds	123.6	165.7	328.9	229.6	120.0	293.4	270.2
Other debt	0.7	87.8	27.6	22.7	132.2	52.2	27.9
Other	31.7	0.2	26.2	46.4	0.0	6.6	1.1
<b>Repair/renovation</b>							
<b>All institutions</b>	837.9	1,009.5	825.7	835.4	1,058.1	1,324.5	1,685.9
Federal Government	27.3	61.1	49.0	56.2	110.7	120.8	65.6
State and local government	233.1	233.8	243.0	252.4	265.5	338.1	444.0
Private donations	101.0	52.1	100.6	73.0	110.7	140.6	203.6
Institutional funds <sup>b</sup>	328.0	570.8	355.4	332.0	432.7	578.6	645.2
Tax-exempt bonds	137.6	69.9	66.4	81.0	50.4	84.6	240.0
Other debt	3.8	15.9	8.0	27.0	78.6	35.7	73.7
Other	7.4	5.2	3.2	16.2	9.3	26.1	13.8

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-17.

**Funds for new construction and repair/renovation of S&E research space, by type of institution and funding source:  
1986–99**

(Millions of current dollars)

Institution type and funding source	1986–87	1988–89	1990–91	1992–93	1994–95	1996–97	1998–99 <sup>a</sup>
<b>Public institutions</b> .....	435.9	698.5	449.3	520.4	495.8	669.6	971.7
Federal Government .....	13.2	31.4	24.6	34.3	38.9	72.4	50.5
State and local government .....	226.6	229.3	233.5	237.1	254.4	328.3	440.1
Private donations .....	15.0	22.0	43.8	24.9	16.0	38.3	67.4
Institutional funds <sup>b</sup> .....	155.1	403.5	134.6	154.4	160.8	179.6	360.5
Tax-exempt bonds .....	25.5	6.6	12.1	55.9	18.3	25.1	50.7
Other debt .....	0.3	4.9	0.0	1.6	0.9	0.3	0.1
Other .....	0.2	0.0	0.6	11.9	6.5	25.7	2.5
<b>Private institutions</b> .....	402.0	311.0	376.4	314.6	562.3	654.9	714.2
Federal Government .....	14.1	29.7	24.4	21.8	71.8	48.4	15.1
State and local government .....	6.5	4.5	9.5	15.0	11.2	9.8	4.0
Private donations .....	86.0	30.1	56.8	47.5	94.8	102.4	136.2
Institutional funds <sup>b</sup> .....	172.9	167.3	220.8	176.3	271.9	399.0	284.8
Tax-exempt bonds .....	112.1	63.3	54.3	24.5	32.2	59.5	189.2
Other debt .....	3.5	11.0	8.0	25.2	77.7	35.4	73.6
Other .....	7.2	5.2	2.6	4.3	2.8	0.4	11.3

<sup>a</sup>Several institutions provided inconsistent information about the costs of new construction and repair/renovation and the source of these funds for 1998 or 1999. Consequently, data for sources of funding may not be consistent with data for construction and repair/renovation costs.

<sup>b</sup>Funds from the institution's operating funds, endowments, indirect costs recovered from Federal grants and/or contracts, indirect costs recovered from other sources, etc.

NOTES: Data for two years are combined, e.g., 1988–89 refers to two fiscal years. Details may not add to 100 because of rounding.

SOURCES: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Scientific and Engineering Research Facilities at Universities and Colleges, various years.

See figure 5-16 in Volume 1.

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Appendix table 5-18.

**Percentage of funds for new construction and repair/renovation of S&E research space, by type of institution and funding source: 1986–99**

Institution type and funding source	1986–87	1988–89	1990–91	1992–93	1994–95	1996–97	1998–99
<b>Total new construction and repair/renovation</b>							
<b>All institutions</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government	6.0	11.9	13.8	14.1	8.3	8.8	6.2
State and local government	35.0	32.4	31.6	33.5	37.8	29.4	29.7
Private donations	20.4	14.7	11.9	10.3	12.3	16.6	14.0
Institutional funds <sup>a</sup>	21.4	26.3	19.7	19.4	22.9	26.4	28.4
Tax-exempt bonds	15.6	11.2	20.9	19.2	12.5	14.4	17.3
Other debt	0.2	3.2	1.1	1.8	5.9	3.2	3.2
Other	1.4	0.2	1.0	1.8	0.4	1.1	1.1
<b>Public institutions</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government	3.0	12.6	16.7	14.2	6.5	10.3	8.9
State and local government	54.8	44.0	42.2	46.0	59.9	47.7	43.7
Private donations	15.3	8.9	7.4	7.0	5.9	11.5	9.6
Institutional funds <sup>a</sup>	14.8	27.2	16.4	13.9	12.8	16.1	24.4
Tax-exempt bonds	12.0	6.6	16.6	17.6	13.7	10.7	10.9
Other debt	0.2	0.5	0.3	0.7	0.6	2.1	1.3
Other	0.0	0.0	0.3	0.6	0.5	1.6	1.3
<b>Private institutions</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government	10.9	10.2	8.5	14.0	11.2	6.7	2.4
State and local government	2.8	5.4	11.8	4.8	1.9	2.0	9.4
Private donations	28.6	28.3	20.3	17.7	22.7	24.3	20.5
Institutional funds <sup>a</sup>	32.2	24.3	25.9	31.7	39.2	41.8	34.4
Tax-exempt bonds	21.5	21.8	28.8	22.9	10.4	19.9	26.7
Other debt	0.4	9.4	2.7	4.3	14.4	4.9	5.9
Other	3.5	0.5	2.2	4.6	0.2	0.4	0.7
<b>New construction</b>							
<b>All institutions</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government	7.1	14.3	16.0	16.3	7.5	8.7	7.8
State and local government	38.0	36.1	32.1	34.4	42.7	31.1	32.0
Private donations	23.8	18.6	11.8	10.7	13.0	19.2	15.3
Institutional funds <sup>a</sup>	14.1	14.0	13.2	13.3	16.0	19.1	21.9
Tax-exempt bonds	15.3	13.0	24.4	22.1	15.4	17.8	19.3
Other debt	0.2	3.9	1.2	1.4	5.3	3.4	2.4
Other	1.6	0.0	1.1	1.8	0.2	0.8	1.2
<b>Public institutions</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government	3.0	15.9	19.2	16.2	6.2	10.1	11.2
State and local government	55.7	48.5	40.1	46.1	62.2	47.3	42.7
Private donations	19.1	11.2	6.9	7.6	6.6	13.4	11.2
Institutional funds <sup>a</sup>	8.1	14.8	13.4	9.8	7.6	12.5	16.3
Tax-exempt bonds	14.0	8.9	19.7	19.4	16.3	13.1	14.5
Other debt	0.2	0.5	0.4	0.8	0.7	2.7	2.1
Other	0.0	0.0	0.3	0.2	0.3	0.8	2.0
<b>Private institutions</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government	15.1	10.5	9.2	16.8	10.2	6.2	2.7
State and local government	3.5	7.1	15.4	4.9	1.8	2.4	15.7
Private donations	32.8	36.1	22.3	18.7	26.4	29.4	21.6
Institutional funds <sup>a</sup>	26.0	11.9	13.0	22.1	33.5	30.7	30.5
Tax-exempt bonds	17.8	22.5	34.4	28.9	13.4	26.2	26.8
Other debt	0.1	11.9	2.9	2.9	14.8	4.7	2.8
Other	4.6	0.0	2.7	5.8	0.0	0.6	0.1
<b>Repair/renovation</b>							
<b>All institutions</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government	3.3	6.1	5.9	6.7	10.5	9.1	3.9
State and local government	27.8	23.2	29.4	30.2	25.1	25.5	26.3
Private donations	12.1	5.2	12.2	8.7	10.5	10.6	12.1
Institutional funds <sup>a</sup>	39.1	56.5	43.0	39.7	40.9	43.7	38.3
Tax-exempt bonds	16.4	6.9	8.0	9.7	4.8	6.4	14.2
Other debt	0.5	1.6	1.0	3.2	7.4	2.7	4.4
Other	0.9	0.5	0.4	1.9	0.9	2.0	0.8

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-18.

**Percentage of funds for new construction and repair/renovation of S&E research space, by type of institution and funding source: 1986–99**

Institution type and funding source	1986–87	1988–89	1990–91	1992–93	1994–95	1996–97	1998–99 <sup>a</sup>
<b>Public institutions</b> .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government .....	3.0	4.5	5.5	6.6	7.8	10.8	5.2
State and local government .....	52.0	32.8	52.0	45.6	51.3	49.0	45.3
Private donations .....	3.4	3.1	9.7	4.8	3.2	5.7	6.9
Institutional funds <sup>a</sup> .....	35.6	57.8	30.0	29.7	32.4	26.8	37.1
Tax-exempt bonds .....	5.8	0.9	2.7	10.7	3.7	3.7	5.2
Other debt .....	0.1	0.7	0.0	0.3	0.2	0.0	0.0
Other .....	0.0	0.0	0.1	2.3	1.3	3.8	0.3
<b>Private institutions</b> .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Federal Government .....	3.5	9.5	6.5	6.9	12.8	7.4	2.1
State and local government .....	1.6	1.4	2.5	4.8	2.0	1.5	0.6
Private donations .....	21.4	9.7	15.1	15.1	16.9	15.6	19.1
Institutional funds <sup>a</sup> .....	43.0	53.8	58.7	56.0	48.4	60.9	39.9
Tax-exempt bonds .....	27.9	20.4	14.4	7.8	5.7	9.1	26.5
Other debt .....	0.9	3.5	2.1	8.0	13.8	5.4	10.3
Other .....	1.8	1.7	0.7	1.4	0.5	0.1	1.6

<sup>a</sup>Funds from the institution's operating funds, endowments, indirect costs recovered from Federal grants and/or contracts, indirect costs recovered from other sources, etc.

NOTES: Data for two years are combined; e.g., 1988–89 refers to two fiscal years. Percentages may not add to 100 because of rounding.

SOURCES: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Scientific and Engineering Research Facilities at Universities and Colleges, various years.

See figure 5-16 in Volume I.

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Appendix table 5-19.

**Expected costs of deferred S&E research facility construction and repair/renovation needs, by field: 1999**  
(Millions of current dollars)

Field	Total, all needs			In a plan <sup>a</sup>		Not in a plan <sup>a</sup>	
	Construction and repair/ renovation	Construction	Repair/ renovation	Construction	Repair/ renovation	Construction	Repair/ renovation
<b>Total S&amp;E<sup>b</sup></b> .....	13,608	8,778	4,831	7,304	3,330	1,474	1,501
Physical sciences .....	1,708	740	967	635	689	105	278
Mathematics .....	158	86	72	78	55	8	17
Computer sciences .....	495	434	60	361	26	73	34
Environmental sciences .....	647	402	245	285	140	117	105
Agricultural sciences .....	947	642	305	517	206	125	99
Biological sciences							
Universities and colleges .....	2,263	1,582	681	1,424	469	158	212
Medical schools .....	969	597	372	470	151	127	221
Medical sciences							
Universities and colleges .....	1,071	882	189	726	117	156	72
Medical schools .....	2,151	1,625	525	1,364	380	261	145
Psychology .....	196	51	146	27	111	24	35
Social sciences .....	482	245	236	108	181	137	55
Other sciences .....	744	536	209	511	195	25	14
Engineering .....	1,777	957	821	798	609	159	212

<sup>a</sup>Refers to whether the deferred need is included (or not included) in a formal institutional plan.<sup>b</sup>Excludes costs for central campus infrastructure.SOURCE: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Scientific and Engineering Research Facilities: 1999*, NSF 01-330 (Arlington, VA, 2001).

Appendix table 5-20.

**Current fund expenditures for research equipment at academic institutions, by field: 1983-99**

Field	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Millions of current dollars																	
<b>Total S&amp;E</b>	450	537	672	783	837	912	986	1,012	1,024	1,033	1,039	1,105	1,235	1,208	1,277	1,291	1,319
<b>Total sciences</b>	371	447	547	637	659	716	784	792	790	808	821	856	966	927	979	992	1,032
Physical sciences	81	104	142	163	166	181	181	191	189	198	207	207	237	234	238	253	248
Astronomy	4	6	7	6	7	7	10	13	14	14	17	20	23	21	26	25	29
Chemistry	32	42	54	59	66	74	76	73	69	70	75	80	81	90	88	91	102
Physics	37	47	71	89	82	85	83	91	88	94	90	88	113	104	105	121	106
Other	8	8	10	9	12	15	12	14	18	20	26	19	22	20	20	16	11
Mathematics	4	5	6	7	10	10	10	10	11	10	15	15	14	13	15	14	12
Computer sciences	20	22	35	43	43	43	43	48	59	45	54	59	76	67	70	63	64
Environmental sciences	31	41	48	51	55	56	67	72	70	78	76	83	81	88	90	101	101
Atmospheric sciences	5	7	8	10	11	10	13	11	10	11	14	11	13	13	14	15	15
Earth sciences	12	16	18	18	20	19	26	27	29	30	27	31	27	30	34	37	35
Ocean sciences	11	14	16	18	17	19	18	20	19	28	24	26	26	28	29	33	37
Other	3	4	5	6	7	7	11	13	12	9	11	15	15	16	12	17	14
Life sciences	209	243	283	331	335	379	431	420	411	429	417	435	464	444	479	492	546
Agricultural sciences	41	42	52	58	49	52	59	54	53	59	53	68	63	62	70	76	73
Biological sciences	74	89	105	120	130	155	175	171	167	174	170	176	192	181	196	189	241
Medical sciences	87	103	114	138	142	156	177	177	169	175	177	172	186	182	197	211	213
Other	7	9	12	15	14	16	20	19	22	21	16	18	22	18	16	16	19
Psychology	7	7	9	9	11	10	11	11	11	11	15	13	12	12	13	13	12
Social sciences	9	14	10	14	12	12	14	15	14	18	19	21	28	25	25	22	18
Economics	2	3	3	4	3	4	4	4	5	5	5	6	8	6	5	4	4
Political science	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	3	2
Sociology	1	2	2	2	2	2	3	3	3	3	4	4	4	4	4	4	3
Other	5	8	4	7	5	4	6	7	5	7	8	9	13	11	12	11	9
Other sciences	10	10	15	20	27	26	26	25	25	18	18	23	53	44	50	33	32
<b>Total engineering</b>	80	90	124	146	178	195	202	220	234	225	218	248	269	281	298	298	286
Aeronautical/astronautical	3	4	7	8	9	9	11	13	17	12	13	19	16	16	19	20	22
Bioengineering/biomedical	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3	6	8
Chemical	6	7	11	14	15	15	19	18	20	20	22	19	22	24	23	28	27
Civil	7	7	10	12	12	17	16	20	18	16	18	18	22	25	27	21	23
Electrical/electronic	23	24	33	36	44	44	49	58	52	57	56	66	68	75	83	82	70
Mechanical	11	15	17	19	25	29	29	32	34	31	35	37	42	42	46	51	51
Materials	NA	NA	NA	NA	NA	NA	NA	27	33	29	23	25	28	32	36	29	28
Other	29	32	46	58	75	81	78	51	59	61	51	65	72	67	60	60	56
Millions of constant 1996 dollars <sup>a</sup>																	
<b>Total S&amp;E</b>	654.0	751.4	911.4	1,039.6	1,078.9	1,137.0	1,184.2	1,170.2	1,142.4	1,124.5	1,105.0	1,150.5	1,258.6	1,208.2	1,252.2	1,250.4	1,258.6
<b>Total sciences</b>	538.5	625.4	742.6	845.8	849.0	893.3	941.7	915.8	881.4	879.4	873.4	892.0	984.6	927.2	960.3	961.4	985.5
Physical sciences	117.2	144.9	192.5	216.3	214.2	226.2	217.1	221.0	211.3	215.7	220.1	215.7	241.8	234.3	233.6	245.3	237.0
Astronomy	6.1	8.3	9.5	7.7	8.4	8.5	12.1	15.3	16.0	15.4	17.8	20.8	22.9	21.0	25.6	24.5	27.5
Chemistry	47.0	59.2	73.2	78.0	84.9	92.4	90.7	84.5	77.1	76.3	79.4	83.1	82.2	90.1	85.9	88.0	97.2
Physics	53.2	65.9	96.7	118.7	105.2	106.3	99.7	105.0	98.2	102.3	95.3	91.8	114.7	103.6	102.9	117.6	101.5
Other	10.9	11.6	13.0	11.8	15.7	18.9	14.6	16.1	20.0	21.7	27.6	20.0	22.0	19.6	19.2	15.2	10.8
Mathematics	5.4	7.5	8.2	9.1	12.6	12.1	12.3	11.8	11.8	11.2	16.1	15.4	14.7	12.9	14.8	14.0	11.3
Computer sciences	29.0	31.1	48.1	56.6	55.2	53.3	51.7	55.5	65.3	49.1	56.9	61.5	77.9	67.3	68.2	61.5	60.9

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-20.

**Current fund expenditures for research equipment at academic institutions, by field: 1983–99**

Field	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Environmental sciences .....	45.1	57.7	64.8	68.0	71.4	69.6	81.0	83.4	78.1	84.4	81.2	86.6	82.7	87.6	88.0	98.3	96.2
Atmospheric sciences .....	7.6	9.6	11.3	13.3	14.5	12.4	15.0	13.2	11.5	11.9	15.4	11.9	13.7	13.2	13.6	14.2	14.0
Earth sciences .....	16.7	22.1	24.8	23.5	26.3	24.1	30.7	31.7	32.2	32.7	28.4	32.2	27.1	30.4	33.7	36.1	33.1
Ocean sciences .....	16.5	20.3	21.9	23.6	21.6	23.7	21.5	23.1	21.1	30.0	25.3	27.2	26.8	27.6	28.5	31.8	35.7
Other .....	4.3	5.7	7.0	7.6	9.1	9.3	13.7	15.4	13.3	9.8	12.1	15.2	15.0	16.4	12.1	16.3	13.4
Life sciences .....	303.5	340.2	383.5	439.0	432.3	473.1	517.6	485.4	458.8	467.2	443.1	453.5	472.7	443.5	469.4	476.4	521.3
Agricultural sciences .....	59.4	58.4	70.1	76.8	63.3	65.3	70.6	61.9	59.2	64.4	56.7	71.2	64.4	62.4	68.3	73.5	69.9
Biological sciences .....	107.1	124.8	142.2	159.1	167.2	193.3	210.5	197.2	186.8	189.3	181.3	183.8	196.1	181.0	192.4	183.1	230.5
Medical sciences .....	126.7	144.5	155.4	183.8	183.1	194.8	212.3	204.6	188.5	190.7	188.3	179.6	189.3	181.9	193.2	204.5	203.0
Other .....	10.3	12.5	15.9	19.4	18.7	19.6	24.3	21.9	24.4	22.8	16.8	18.8	22.9	18.3	15.5	15.4	17.8
Psychology .....	9.5	10.2	11.8	11.5	13.6	11.9	12.8	12.4	12.4	12.2	16.5	13.3	12.5	12.0	13.1	12.8	11.1
Social sciences .....	13.7	19.4	13.7	18.7	15.2	14.8	17.4	17.4	15.6	19.5	20.2	22.4	28.3	25.2	24.4	21.4	17.1
Economics .....	3.1	3.8	3.8	4.9	3.7	5.5	4.9	4.7	5.0	5.5	4.9	5.7	7.7	6.5	5.1	3.7	3.7
Political science .....	1.3	1.5	1.6	1.8	1.7	1.1	2.0	1.7	2.2	2.7	3.0	3.1	3.3	3.5	3.3	3.3	1.9
Sociology .....	2.0	2.7	2.7	2.9	2.7	2.6	3.6	3.3	2.9	3.7	3.9	4.1	4.2	4.1	4.2	3.8	3.3
Other .....	7.3	11.3	5.6	9.2	7.1	5.5	6.9	7.7	5.4	7.5	8.4	9.5	13.0	11.1	11.8	10.7	8.2
Other sciences .....	15.1	14.4	20.0	26.7	34.6	32.3	31.8	29.0	28.1	20.1	19.3	23.7	54.0	44.4	48.7	31.6	30.6
<b>Total engineering .....</b>	<b>115.5</b>	<b>126.0</b>	<b>168.8</b>	<b>193.7</b>	<b>229.9</b>	<b>243.7</b>	<b>242.5</b>	<b>254.4</b>	<b>261.0</b>	<b>245.1</b>	<b>231.6</b>	<b>258.5</b>	<b>274.0</b>	<b>281.0</b>	<b>291.9</b>	<b>289.0</b>	<b>273.2</b>
Aeronautical/astronautical ....	5.0	6.1	8.9	10.0	11.0	11.3	13.5	14.6	19.4	12.7	14.1	19.3	16.3	15.5	18.4	18.9	21.1
Bioengineering/biomedical ....	NA	3.1	6.0	7.3													
Chemical .....	8.8	10.4	15.4	18.6	18.9	19.1	23.2	20.8	22.3	21.7	22.9	19.5	22.3	23.8	22.6	27.6	26.2
Civil .....	10.5	9.5	14.1	15.5	14.9	21.5	18.7	23.3	19.9	17.1	19.6	19.0	22.2	24.8	26.3	20.8	22.3
Electrical/electronic .....	32.8	33.9	44.4	47.8	56.3	54.7	58.3	67.5	58.0	62.3	59.4	68.6	69.1	75.4	81.7	79.8	66.8
Mechanical .....	16.2	20.7	23.7	25.2	32.5	36.1	35.0	37.5	38.2	34.0	36.7	38.5	42.4	42.1	45.0	49.5	48.5
Materials .....	NA	NA	NA	NA	NA	NA	31.2	37.0	31.1	24.9	25.9	28.4	32.2	35.5	28.1	27.2	
Other .....	42.2	45.3	62.2	76.5	96.3	100.9	93.8	59.4	66.3	66.2	54.0	67.8	73.3	67.2	59.2	58.3	53.7
Percent																	
<b>Total S&amp;E .....</b>	<b>100.0</b>																
<b>Total sciences .....</b>	<b>82.3</b>	<b>83.2</b>	<b>81.5</b>	<b>81.4</b>	<b>78.7</b>	<b>78.6</b>	<b>79.5</b>	<b>78.3</b>	<b>77.2</b>	<b>78.2</b>	<b>79.0</b>	<b>77.5</b>	<b>78.2</b>	<b>76.7</b>	<b>76.7</b>	<b>76.9</b>	<b>78.3</b>
Physical sciences .....	17.9	19.3	21.1	20.8	19.9	19.9	18.3	18.9	18.5	19.2	19.9	18.7	19.2	19.4	18.7	19.6	18.8
Astronomy .....	0.9	1.1	1.0	0.7	0.8	0.7	1.0	1.3	1.4	1.4	1.6	1.8	1.8	1.7	2.0	2.0	2.2
Chemistry .....	7.2	7.9	8.0	7.5	7.9	8.1	7.7	7.2	6.8	6.8	7.2	7.2	6.5	7.5	6.9	7.0	7.7
Physics .....	8.1	8.8	10.6	11.4	9.7	9.4	8.4	9.0	8.6	9.1	8.6	8.0	9.1	8.6	8.2	9.4	8.1
Other .....	1.7	1.5	1.4	1.1	1.5	1.7	1.2	1.4	1.8	1.9	2.5	1.7	1.7	1.6	1.5	1.2	0.9
Mathematics .....	0.8	1.0	0.9	0.9	1.2	1.1	1.0	1.0	1.0	1.0	1.5	1.3	1.2	1.1	1.2	1.1	0.9
Computer sciences .....	4.4	4.1	5.3	5.4	5.1	4.7	4.4	4.7	5.7	4.4	5.2	5.3	6.2	5.6	5.4	4.9	4.8
Environmental sciences .....	6.9	7.7	7.1	6.5	6.6	6.1	6.8	7.1	6.8	7.5	7.3	7.5	6.6	7.2	7.0	7.9	7.6
Atmospheric sciences .....	1.2	1.3	1.2	1.3	1.3	1.1	1.3	1.1	1.0	1.1	1.4	1.0	1.1	1.1	1.1	1.1	1.1
Earth sciences .....	2.6	2.9	2.7	2.3	2.4	2.1	2.6	2.7	2.8	2.9	2.6	2.8	2.2	2.5	2.7	2.9	2.6
Ocean sciences .....	2.5	2.7	2.4	2.3	2.0	2.1	1.8	2.0	1.8	2.7	2.3	2.4	2.1	2.3	2.3	2.5	2.8
Other .....	0.7	0.8	0.8	0.7	0.8	0.8	1.2	1.3	1.2	0.9	1.1	1.3	1.2	1.4	1.0	1.3	1.1
Life sciences .....	46.4	45.3	42.1	42.2	40.1	41.6	43.7	41.5	40.2	41.5	40.1	39.4	37.6	36.7	37.5	38.1	41.4
Agricultural sciences .....	9.1	7.8	7.7	7.4	5.9	5.7	6.0	5.3	5.2	5.7	5.1	6.2	5.1	5.2	5.5	5.9	5.6
Biological sciences .....	16.4	16.6	15.6	15.3	15.5	17.0	17.8	16.8	16.3	16.8	16.4	16.0	15.6	15.0	15.4	14.6	18.3
Medical sciences .....	19.4	19.2	17.0	17.7	17.0	17.1	17.9	17.5	16.5	17.0	17.0	15.6	15.0	15.1	15.4	16.4	16.1
Other .....	1.6	1.7	1.7	1.9	1.7	1.7	2.1	1.9	2.1	2.0	1.5	1.6	1.8	1.5	1.2	1.2	1.4

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-20.

**Current fund expenditures for research equipment at academic institutions, by field: 1983–99**

Field	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Psychology .....	1.4	1.4	1.3	1.1	1.3	1.1	1.1	1.1	1.1	1.1	1.5	1.2	1.0	1.0	1.0	1.0	0.9
Social sciences .....	2.1	2.6	1.5	1.8	1.4	1.3	1.5	1.5	1.4	1.7	1.8	1.9	2.2	2.1	2.0	1.7	1.4
Economics .....	0.5	0.5	0.4	0.5	0.3	0.5	0.4	0.4	0.4	0.5	0.4	0.5	0.6	0.5	0.4	0.3	0.3
Political science .....	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2
Sociology .....	0.3	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Other .....	1.1	1.5	0.6	0.9	0.7	0.5	0.6	0.7	0.5	0.7	0.8	0.8	1.0	0.9	0.9	0.9	0.7
Other sciences .....	2.3	1.9	2.2	2.6	3.2	2.8	2.7	2.5	2.5	1.8	1.7	2.1	4.3	3.7	3.9	2.5	2.4
<b>Total engineering .....</b>	<b>17.7</b>	<b>16.8</b>	<b>18.5</b>	<b>18.6</b>	<b>21.3</b>	<b>21.4</b>	<b>20.5</b>	<b>21.7</b>	<b>22.8</b>	<b>21.8</b>	<b>21.0</b>	<b>22.5</b>	<b>21.8</b>	<b>23.3</b>	<b>23.3</b>	<b>23.1</b>	<b>21.7</b>
Aeronautical/astronautical ....	0.8	0.8	1.0	1.0	1.0	1.0	1.1	1.2	1.7	1.1	1.3	1.7	1.3	1.3	1.5	1.5	1.7
Bioengineering/biomedical ....	NA	0.3	0.5	0.6													
Chemical .....	1.3	1.4	1.7	1.8	1.8	1.7	2.0	1.8	1.9	1.9	2.1	1.7	1.8	2.0	1.8	2.2	2.1
Civil .....	1.6	1.3	1.6	1.5	1.4	1.9	1.6	2.0	1.7	1.5	1.8	1.6	1.8	2.1	2.1	1.7	1.8
Electrical/electronic .....	5.0	4.5	4.9	4.6	5.2	4.8	4.9	5.8	5.1	5.5	5.4	6.0	5.5	6.2	6.5	6.4	5.3
Mechanical .....	2.5	2.8	2.6	2.4	3.0	3.2	3.0	3.2	3.3	3.0	3.3	3.3	3.4	3.5	3.6	4.0	3.9
Materials .....	NA	2.7	3.2	2.8	2.3	2.3	2.3	2.7	2.8	2.3	2.2						
Other .....	6.5	6.0	6.8	7.4	8.9	8.9	7.9	5.1	5.8	5.9	4.9	5.9	5.8	5.6	4.7	4.7	4.3

NA = not available

<sup>a</sup>See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1996 dollars.SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Academic Science and Engineering R&D Expenditures: Fiscal Year 1999, Detailed Statistical Tables*, NSF 01-329 (Arlington, VA, 2001); and NSF, unpublished tabulations.

See figure 5-17 in Volume 1.

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Science &amp; Engineering Indicators – 2002

Appendix table 5-21.

**Current funds provided by Federal Government for research equipment at academic institutions, by field: 1983–99**  
 (Percentage)

Field	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>Total S&amp;E</b> .....	62.3	63.7	64.4	64.0	62.9	63.2	60.4	59.9	59.6	59.8	61.2	60.5	59.1	59.4	58.6	59.8	57.9
<b>Total sciences</b> .....	61.6	63.7	64.7	65.3	63.9	64.0	61.0	60.1	60.1	60.8	61.9	60.3	58.6	58.8	59.3	59.8	57.7
Physical sciences .....	78.8	79.9	79.8	80.1	78.5	78.7	73.7	75.3	73.5	76.5	74.2	73.2	74.8	73.2	71.2	74.0	75.0
Astronomy .....	84.0	74.3	69.3	70.1	75.1	76.5	69.3	63.2	61.7	69.0	65.3	63.4	61.1	70.1	64.7	81.9	86.8
Chemistry .....	71.7	76.1	76.7	73.1	74.1	77.5	70.3	71.5	68.2	72.1	70.6	69.3	70.7	69.9	66.7	67.2	67.5
Physics .....	83.4	84.3	84.5	85.8	82.2	79.7	78.3	81.1	79.0	80.8	75.8	79.5	81.9	77.2	76.3	76.4	79.8
Other .....	84.4	77.9	70.9	75.7	80.1	79.9	66.6	69.5	76.8	76.9	84.6	71.1	67.5	71.3	71.9	81.5	67.4
Mathematics .....	66.4	76.7	82.1	76.1	77.6	78.0	67.6	65.9	62.8	68.4	75.1	72.3	63.6	74.2	56.3	70.8	64.7
Computer sciences .....	72.7	75.7	83.0	82.5	79.3	81.3	71.9	65.8	74.6	65.7	69.8	68.8	63.0	71.0	68.1	70.4	68.8
Environmental sciences .....	61.7	71.0	67.6	68.1	64.9	65.7	66.1	65.8	61.3	67.0	70.6	72.2	68.5	68.0	73.0	67.9	67.1
Atmospheric sciences .....	71.3	74.5	84.2	81.3	79.7	78.6	65.1	76.8	75.8	78.0	78.0	81.8	71.8	64.1	77.5	81.5	79.6
Earth sciences .....	54.9	62.8	56.3	54.7	51.8	58.0	63.1	56.9	53.2	58.3	61.3	67.3	60.9	65.3	69.7	66.5	59.0
Ocean sciences .....	63.7	80.3	74.0	77.6	74.9	72.3	74.7	75.0	71.6	75.9	79.6	78.2	74.8	81.1	75.0	70.8	72.2
Other .....	63.5	64.2	60.6	57.2	55.2	51.5	60.5	61.2	52.1	55.7	64.3	64.5	67.9	54.1	72.5	53.6	60.5
Life sciences .....	54.9	56.5	55.6	57.0	56.0	56.7	55.2	53.2	53.6	53.7	54.3	52.2	48.6	49.9	50.0	50.8	49.0
Agricultural sciences .....	26.8	32.3	29.1	31.1	31.8	31.4	30.9	28.4	30.6	36.5	36.7	35.1	31.8	29.0	30.8	31.8	32.6
Biological sciences .....	66.0	67.6	67.3	66.9	64.5	64.8	62.9	60.1	60.4	61.0	60.8	60.4	56.0	58.4	55.6	56.4	56.6
Medical sciences .....	58.5	56.4	57.4	59.5	57.5	57.5	55.4	54.3	54.4	53.4	54.1	51.8	48.2	49.9	51.4	53.1	46.7
Other .....	58.2	58.7	49.1	54.8	47.6	53.0	56.8	50.6	50.8	44.4	45.8	41.6	34.8	36.9	47.7	43.8	41.6
Psychology .....	69.7	68.2	71.4	67.6	76.5	68.4	65.2	63.6	64.4	63.9	68.7	60.9	64.5	62.9	64.1	62.6	65.4
Social sciences .....	32.9	28.2	40.0	30.4	29.3	27.9	33.6	32.5	36.6	43.2	40.1	41.1	38.6	39.8	37.7	40.1	38.9
Economics .....	40.4	44.9	35.6	31.3	28.9	18.1	25.8	27.2	33.8	48.8	40.2	43.7	37.1	40.0	29.7	34.5	37.8
Political science .....	36.9	39.2	32.1	26.2	26.8	36.8	23.0	24.4	32.0	45.7	30.5	48.4	35.2	32.1	34.3	47.3	33.2
Sociology .....	59.6	54.6	53.5	42.1	37.5	40.8	38.0	43.2	52.6	52.1	52.3	43.8	45.9	49.5	44.6	47.9	43.2
Other .....	21.4	14.8	39.0	27.0	26.9	29.7	39.8	32.9	32.4	33.7	37.9	35.9	37.9	38.4	39.7	37.1	39.0
Other sciences .....	59.8	54.3	46.1	58.4	51.1	46.5	49.6	46.1	38.3	28.4	41.3	42.9	59.7	39.8	65.6	47.3	26.9
<b>Total engineering</b> .....	65.3	63.6	62.9	58.4	59.1	60.3	57.9	58.9	57.9	56.3	58.8	61.0	60.9	61.3	56.2	59.7	58.6
Aeronautical/astronautical ....	76.7	75.3	75.0	74.1	74.7	76.6	76.8	81.1	83.8	75.1	81.3	76.3	76.8	70.3	69.8	69.1	71.1
Bioengineering/biomedical ...	NA	52.5	42.3	46.7													
Chemical .....	58.1	53.9	58.7	58.8	53.6	54.0	52.2	46.1	49.0	50.6	46.8	58.2	59.0	56.9	55.0	55.6	49.3
Civil .....	51.5	55.8	58.5	50.8	57.6	61.2	55.5	58.7	46.7	44.9	44.6	44.1	43.8	44.1	43.9	43.3	49.5
Electrical/electronic .....	71.1	68.4	68.5	66.0	69.0	66.5	60.8	61.8	58.2	59.4	65.9	66.6	61.9	68.4	60.8	66.7	65.3
Mechanical .....	68.5	70.0	65.1	61.6	63.9	66.4	57.2	56.8	51.8	60.1	64.6	65.9	63.9	63.2	62.5	64.3	63.8
Materials .....	NA	66.5	59.7	48.8	50.9	48.6	50.5	52.6	51.3	59.5	61.1						
Other .....	63.2	59.3	58.5	52.0	51.1	53.9	55.6	52.2	59.0	56.2	55.1	58.3	64.3	62.3	49.7	52.6	49.4

NA = not available

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Academic Science and Engineering R&D Expenditures: Fiscal Year 1999, Detailed Statistical Tables*, NSF 01-329 (Arlington, VA, 2001); and NSF, unpublished tabulations.

Appendix table 5-22.

**Expenditures of current funds for research equipment at academic institutions as a percentage of total academic R&D expenditures,  
by field: 1983–99**

Field	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>Total S&amp;E</b> .....	5.7	6.2	6.9	7.2	6.9	6.8	6.6	6.2	5.8	5.5	5.2	5.3	5.6	5.2	5.2	5.0	4.8
<b>Total sciences</b> .....	5.5	6.0	6.6	6.9	6.4	6.3	6.2	5.8	5.4	5.1	4.9	4.8	5.2	4.8	4.6	4.6	4.4
Physical sciences .....	9.0	10.3	12.4	12.7	11.9	11.7	11.0	10.6	9.8	9.6	9.7	9.5	10.5	10.4	10.1	10.2	9.6
Astronomy .....	5.7	7.3	7.3	5.7	6.0	5.4	7.3	7.8	6.8	5.9	6.5	7.5	7.4	7.6	9.1	8.4	7.4
Chemistry .....	9.7	11.4	12.8	12.5	12.8	13.1	12.5	11.3	10.3	9.9	10.1	10.5	10.5	11.3	10.7	10.4	11.1
Physics .....	8.8	9.9	12.9	14.2	12.1	11.5	10.6	10.8	10.0	10.2	9.5	9.2	11.4	10.5	10.0	11.3	9.3
Other .....	10.1	11.1	12.0	10.5	11.8	12.4	10.4	9.5	10.2	10.4	13.6	9.9	11.3	10.2	9.6	6.9	7.4
Mathematics .....	3.5	4.3	4.7	4.5	5.5	4.9	4.8	4.6	4.6	4.2	5.6	5.3	5.2	4.5	5.2	4.6	3.8
Computer sciences .....	10.7	9.9	12.6	13.3	11.5	10.5	9.1	9.3	10.6	8.1	8.8	9.1	11.2	9.8	9.8	8.5	7.4
Environmental sciences .....	5.0	6.4	6.8	6.6	6.6	6.2	6.7	6.8	6.3	6.2	5.8	6.0	5.7	5.9	5.9	6.3	6.0
Atmospheric sciences .....	5.3	6.7	7.7	8.3	8.5	7.2	7.6	6.6	5.9	5.6	6.9	5.6	6.5	5.9	5.9	5.4	5.1
Earth sciences .....	5.3	6.9	7.2	6.5	7.2	6.6	7.9	7.7	7.5	7.3	6.4	6.8	5.8	6.8	7.7	7.3	6.4
Ocean sciences .....	5.1	6.1	6.3	6.4	5.6	5.7	5.0	5.3	4.9	6.5	5.2	5.7	5.6	5.2	5.4	6.0	6.2
Other .....	3.8	5.2	6.0	5.6	5.7	5.8	7.3	8.2	7.1	4.3	4.9	5.2	5.0	5.7	4.1	5.7	5.5
Life sciences .....	4.9	5.2	5.4	5.6	5.1	5.2	5.3	4.8	4.3	4.2	3.8	3.8	3.8	3.5	3.5	3.4	3.5
Agricultural sciences .....	4.4	4.4	5.2	5.3	4.4	4.5	4.6	4.0	3.6	3.9	3.4	4.1	3.5	3.3	3.5	3.8	3.6
Biological sciences .....	5.2	5.7	5.9	6.2	6.0	6.4	6.6	6.0	5.5	5.3	4.8	4.8	5.0	4.6	4.7	4.1	4.8
Medical sciences .....	4.8	5.1	4.9	5.3	4.7	4.6	4.6	4.3	3.7	3.5	3.3	3.1	3.1	2.8	2.9	2.8	2.7
Other .....	5.4	5.9	6.5	6.1	5.5	5.3	6.3	5.2	5.4	5.0	3.7	4.0	4.8	3.6	3.0	2.9	3.4
Psychology .....	4.8	5.0	5.5	5.1	5.6	4.5	4.6	4.2	3.9	3.4	4.4	3.6	3.3	3.1	3.4	3.0	2.5
Social sciences .....	2.7	3.9	2.6	3.0	2.4	2.1	2.3	2.1	1.9	2.2	2.1	2.3	2.7	2.3	2.2	2.0	1.4
Economics .....	2.2	2.5	2.3	2.7	1.9	2.7	2.2	2.0	2.2	2.3	2.0	2.3	3.0	2.4	2.0	1.5	1.5
Political science .....	1.6	2.0	2.0	2.0	1.6	1.1	1.6	1.3	1.6	1.7	1.9	1.9	1.9	1.9	1.9	1.9	1.0
Sociology .....	1.8	2.7	2.6	2.3	2.2	2.0	2.5	2.2	1.7	2.1	2.0	2.0	1.9	1.8	1.7	1.6	1.3
Other .....	4.4	6.5	3.2	4.3	3.1	2.3	2.6	2.6	1.9	2.4	2.4	2.6	3.4	2.7	2.8	2.5	1.6
Other sciences .....	6.3	5.7	7.9	8.8	10.5	9.0	8.3	7.5	7.6	5.9	4.9	5.9	12.4	10.6	9.8	7.3	7.1
<b>Total engineering</b> .....	7.1	7.3	8.8	8.9	9.4	9.3	8.4	8.3	8.1	7.3	6.9	7.4	7.6	7.6	7.7	7.3	6.7
Aeronautical/astronautical ....	5.0	6.2	8.2	8.0	7.9	7.4	7.5	7.7	9.7	5.9	6.2	8.5	6.6	6.7	7.6	7.8	8.5
Bioengineering/biomedical ....	NA	4.2	6.1	5.6													
Chemical .....	6.3	7.3	9.8	10.6	9.9	9.4	10.0	8.3	8.2	7.6	7.9	6.7	7.4	7.5	7.3	8.7	7.9
Civil .....	5.7	4.9	6.8	6.6	6.1	7.7	6.4	7.1	5.7	4.6	5.0	4.5	5.1	5.4	5.7	4.3	4.4
Electrical/electronic .....	8.6	8.2	9.7	9.1	9.7	8.6	8.2	8.8	7.7	8.1	8.0	8.8	8.3	8.5	8.8	7.9	6.9
Mechanical .....	7.5	8.3	8.4	8.3	9.2	9.6	8.5	8.3	8.1	6.9	7.2	7.4	8.0	8.1	8.9	9.0	8.1
Materials .....	NA	9.9	10.9	9.7	7.8	8.0	8.5	9.2	9.3	7.4	7.4						
Other .....	6.9	7.2	8.8	9.4	10.4	10.5	9.0	7.7	7.8	7.4	6.2	7.2	8.2	7.1	6.9	6.7	5.9

NA = not available

SOURCES: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Academic Science and Engineering R&D Expenditures: Fiscal Year 1999, Detailed Statistical Tables*, NSF 01-329 (Arlington, VA, 2001); and NSF, unpublished tabulations.

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Appendix table 5-23.

**Doctoral scientists and engineers in research universities and other academic institutions,  
by type of appointment and primary work activity: 1973–99**

(Thousands)

Year	All academic institutions				Research universities				All other institutions			
	Total	Teaching	Research	Other	Total	Teaching	Research	Other	Total	Teaching	Research	Other
<b>Total employment</b>												
1973 .....	118.0	73.3	27.8	16.9	65.2	32.3	22.9	10.1	52.7	41.0	4.9	6.8
1975 .....	134.1	83.8	30.8	19.4	73.4	36.5	25.5	11.4	60.7	47.3	5.3	8.1
1977 .....	145.4	82.2	37.0	26.2	78.2	33.4	29.5	15.4	67.2	48.8	7.5	10.9
1979 .....	155.3	83.8	41.3	30.2	83.5	34.0	32.1	17.4	71.8	49.8	9.2	12.8
1981 .....	167.1	95.9	46.5	24.7	91.0	39.3	37.5	14.3	76.0	56.7	9.0	10.4
1983 .....	176.1	97.7	48.9	29.6	89.9	36.8	37.4	15.6	86.2	60.8	11.4	13.9
1985 .....	190.2	101.0	55.9	33.3	102.8	38.3	45.4	19.1	87.4	62.7	10.6	14.2
1987 .....	195.9	99.3	66.5	30.1	106.9	36.0	53.7	17.2	89.0	63.3	12.8	12.9
1989 .....	206.6	100.9	72.2	33.5	112.5	35.8	58.1	18.7	94.1	65.1	14.1	14.9
1991 .....	210.6	103.4	73.9	33.2	111.6	34.5	57.9	19.2	99.0	69.0	16.0	14.0
1993 .....	213.8	98.3	80.2	35.2	113.0	32.8	60.6	19.5	100.8	65.5	19.6	15.7
1995 .....	217.5	100.2	83.0	34.3	112.8	31.7	62.4	18.7	104.8	68.5	20.7	15.6
1997 .....	232.5	105.4	88.6	38.6	113.6	33.4	60.6	19.6	118.9	72.0	27.9	19.0
1999 .....	240.2	108.6	91.4	40.2	117.2	33.3	64.3	19.7	122.9	75.3	27.1	20.5
<b>Full-time faculty</b>												
1973 .....	103.3	69.9	19.8	13.6	55.7	31.1	16.3	8.3	47.6	38.8	3.5	5.3
1975 .....	116.4	80.2	21.4	14.8	61.5	35.1	17.4	8.9	54.9	45.1	3.9	5.9
1977 .....	125.6	78.4	25.8	21.3	64.7	32.1	20.0	12.6	61.0	46.4	5.8	8.8
1979 .....	131.2	79.7	28.1	23.4	67.1	32.5	21.1	13.5	64.1	47.3	7.0	9.9
1981 .....	141.9	92.1	31.8	18.0	73.8	37.9	25.1	10.7	68.2	54.1	6.7	7.4
1983 .....	148.4	91.9	33.6	22.9	72.2	34.9	25.2	12.1	76.2	57.0	8.4	10.8
1985 .....	156.9	94.9	39.5	22.5	80.6	35.9	31.5	13.3	76.2	59.0	8.0	9.2
1987 .....	164.4	93.6	48.6	22.2	84.2	33.6	38.4	12.2	80.2	60.0	10.1	10.0
1989 .....	169.8	93.9	51.6	24.2	86.6	32.9	40.7	13.0	83.2	61.1	10.9	11.2
1991 .....	173.1	96.7	53.8	22.6	85.8	32.2	41.1	12.5	87.3	64.5	12.7	10.2
1993 .....	172.4	91.4	56.9	24.1	84.4	30.5	41.5	12.4	88.1	61.0	15.3	11.7
1995 .....	171.4	91.9	56.6	22.9	81.6	29.1	41.0	11.5	89.7	62.8	15.5	11.3
1997 .....	178.4	95.4	58.0	24.9	81.5	29.9	39.5	12.1	96.8	65.5	18.5	12.8
1999 .....	184.0	98.6	60.4	25.0	84.1	30.2	42.2	11.8	99.9	68.4	18.3	13.2
<b>Postdoctorates</b>												
1973 .....	4.2	0.1	3.8	0.2	3.5	0.1	3.2	0.2	0.7	0.0	0.6	0.1
1975 .....	6.2	0.1	5.7	0.4	5.3	0.1	4.9	0.3	0.9	0.1	0.8	0.1
1977 .....	7.6	0.1	6.8	0.7	6.5	0.1	5.9	0.6	1.1	0.0	0.9	0.1
1979 .....	8.1	0.2	6.9	1.0	6.8	0.1	5.8	0.9	1.3	0.1	1.1	0.1
1981 .....	8.5	0.1	7.7	0.7	7.0	0.0	6.5	0.5	1.5	0.1	1.2	0.2
1983 .....	8.3	0.4	7.1	0.7	6.7	0.2	6.1	0.4	1.6	0.3	1.1	0.3
1985 .....	8.7	0.2	7.5	0.9	7.4	0.2	6.5	0.7	1.3	0.0	1.1	0.2
1987 .....	9.3	0.2	8.4	0.7	8.1	0.2	7.3	0.6	1.2	0.0	1.0	0.2
1989 .....	11.5	0.4	10.3	0.8	9.7	0.2	8.9	0.6	1.8	0.2	1.4	0.2
1991 .....	9.9	0.1	9.2	0.6	8.3	0.1	7.8	0.4	1.5	0.1	1.3	0.1
1993 .....	13.3	0.0	12.7	0.7	11.3	0.0	10.8	0.6	2.0	0.0	1.9	0.1
1995 .....	16.8	0.6	15.1	1.1	13.6	0.3	12.4	0.9	3.2	0.3	2.7	0.2
1997 .....	18.9	0.6	16.7	1.5	13.9	0.4	12.3	1.2	5.0	0.2	4.4	0.4
1999 .....	18.5	0.4	16.6	1.5	14.1	0.3	12.6	1.2	4.5	0.1	4.0	0.3
<b>All other types of positions</b>												
1973 .....	10.5	3.3	4.1	3.1	6.1	1.2	3.3	1.6	4.5	2.2	0.9	1.5
1975 .....	11.5	3.5	3.8	4.2	6.6	1.3	3.3	2.2	4.8	2.1	0.6	2.0
1977 .....	12.2	3.6	4.3	4.2	7.1	1.2	3.6	2.2	5.2	2.5	0.7	2.0
1979 .....	15.9	3.9	6.2	5.8	9.6	1.4	5.2	3.0	6.3	2.5	1.0	2.8
1981 .....	16.6	3.7	6.9	6.0	10.2	1.3	5.9	3.1	6.4	2.4	1.1	2.9
1983 .....	19.4	5.4	8.1	5.9	11.0	1.8	6.0	3.1	8.5	3.6	2.1	2.8
1985 .....	24.6	5.9	9.0	9.8	14.8	2.3	7.5	5.0	9.9	3.7	1.5	4.7
1987 .....	22.1	5.5	9.6	7.1	14.5	2.2	7.9	4.4	7.6	3.2	1.6	2.7
1989 .....	25.4	6.6	10.3	8.6	16.2	2.6	8.4	5.1	9.1	3.8	1.9	3.4
1991 .....	27.6	6.6	10.9	10.1	17.5	2.2	9.0	6.4	10.1	4.4	2.0	3.7
1993 .....	28.1	6.9	10.7	10.4	17.3	2.4	8.3	6.6	10.8	4.6	2.4	3.9
1995 .....	29.4	7.7	11.4	10.3	17.5	2.3	8.9	6.2	11.8	5.3	2.4	4.1
1997 .....	35.3	9.4	13.8	12.1	18.2	3.1	8.8	6.4	17.0	6.3	4.9	5.8
1999 .....	37.5	9.5	14.3	13.7	19.0	2.8	9.5	6.8	18.5	6.7	4.9	6.9

NOTES: Details may not add to total because of rounding and omission of respondents with unreported work responsibility. Data exclude scientists and engineers with doctorates from foreign institutions. Institutions are designated by 1994 Carnegie classification code. (See Carnegie Foundation for the Advancement of Teaching, *A Classification of Institutions of Higher Education* (Princeton, NJ: Princeton University Press, 1994)).

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients, unpublished tabulations.

Appendix table 5-24.

**U.S. and foreign-born doctoral scientists and engineers with U.S. doctorates at academic institutions, by type of position and field of degree: 1973-99**

Field of degree and place of birth	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>All positions</b>														
<b>Total S&amp;E</b>	117,957	134,051	145,445	155,314	167,068	176,082	190,218	195,896	206,619	210,580	213,758	217,543	232,505	240,169
U.S.	102,527	116,783	127,178	132,539	142,353	149,211	159,468	164,313	171,760	174,128	173,262	175,764	185,957	191,158
Foreign	13,531	15,293	16,405	21,708	23,647	25,685	29,724	30,802	33,978	36,261	40,470	41,779	46,548	49,011
Percent foreign	11.7	11.6	11.4	14.1	14.2	14.7	15.7	15.8	16.5	17.2	18.9	19.2	20.0	20.4
<b>Physical sciences</b>	22,064	23,585	24,952	24,623	25,336	25,133	27,006	27,169	27,692	27,681	28,644	29,350	30,211	30,948
U.S.	18,746	20,173	21,300	20,613	21,204	20,977	22,165	22,043	22,255	22,389	22,028	22,817	23,348	23,990
Foreign	2,916	3,037	3,213	3,843	3,959	3,953	4,683	5,003	5,304	5,270	6,616	6,533	6,863	6,958
Percent foreign	13.2	12.9	12.9	15.6	15.6	15.7	17.3	18.4	19.2	19.0	23.1	22.3	22.7	22.5
<b>Mathematics</b>	9,664	11,028	11,671	12,196	12,377	12,920	13,562	13,813	14,490	15,224	15,476	14,598	15,555	15,180
U.S.	8,439	9,624	10,295	10,217	10,216	10,526	10,878	11,168	11,340	11,579	11,451	10,873	11,326	10,955
Foreign	1,073	1,257	1,215	1,858	2,030	2,261	2,570	2,573	3,078	3,645	4,025	3,726	4,229	4,224
Percent foreign	11.1	11.4	10.4	15.2	16.4	17.5	19.0	18.6	21.2	23.9	26.0	25.5	27.2	27.8
<b>Computer sciences</b>	NA	NA	NA	80	280	488	785	1,070	1,494	1,955	2,527	3,148	3,325	3,700
U.S.	NA	NA	NA	—	196	343	531	764	931	1,095	1,472	1,823	1,877	2,321
Foreign	NA	NA	NA	—	84	145	254	306	563	860	1,055	1,324	1,447	1,379
Percent foreign	NA	NA	NA	—	30	30	32	29	38	44	42	42	44	37
<b>Earth, atmospheric, and ocean sciences</b>	3,420	3,899	4,204	4,236	4,581	4,805	5,246	5,578	5,861	6,050	6,435	6,419	7,327	7,792
U.S.	3,112	3,453	3,708	3,721	4,001	4,164	4,487	4,853	5,005	5,278	5,440	5,328	5,944	6,554
Foreign	271	392	441	484	532	607	714	678	789	771	995	1,091	1,382	1,238
Percent foreign	7.9	10.1	10.5	11.4	11.6	12.6	13.6	12.2	13.5	12.8	15.5	17.0	18.9	15.9
<b>Life sciences</b>	34,854	39,365	42,601	47,007	51,322	54,825	58,679	61,247	64,755	66,939	68,193	71,616	77,299	81,862
U.S.	30,928	34,762	37,806	40,717	44,364	47,714	50,984	53,092	56,014	57,802	57,788	60,479	64,003	66,384
Foreign	3,276	3,943	4,257	5,910	6,506	6,645	7,301	7,848	8,385	9,109	10,405	11,137	13,296	15,478
Percent foreign	9.4	10.0	10.0	12.6	12.7	12.1	12.4	12.8	12.9	13.6	15.3	15.6	17.2	18.9
<b>Psychology</b>	12,209	14,768	16,166	17,727	20,117	21,012	23,094	23,737	25,003	25,175	24,964	26,149	27,318	28,970
U.S.	11,265	13,688	15,080	16,488	18,568	19,476	21,277	22,065	23,210	23,393	23,227	24,385	25,230	26,790
Foreign	750	854	929	1,136	1,468	1,428	1,667	1,583	1,687	1,686	1,717	1,764	2,087	2,180
Percent foreign	6.1	5.8	5.7	6.4	7.3	6.8	7.2	6.7	6.7	6.7	6.9	6.7	7.6	7.5
<b>Social sciences</b>	23,376	27,985	31,094	33,600	36,914	38,765	41,909	42,113	44,499	44,786	44,376	42,469	44,901	46,210
U.S.	20,068	24,126	27,076	28,632	31,319	32,797	35,229	35,909	37,676	37,535	37,072	35,282	36,765	37,504
Foreign	2,948	3,472	3,666	4,749	5,432	5,772	6,553	6,092	6,707	7,231	7,304	7,187	8,136	8,706
Percent foreign	12.6	12.4	11.8	14.1	14.7	14.9	15.6	14.5	15.1	16.1	16.5	16.9	18.1	18.8
<b>Engineering</b>	12,370	13,421	14,757	15,845	16,141	18,134	19,937	21,169	22,825	22,771	23,143	23,793	26,570	25,508
U.S.	9,969	10,957	11,913	12,104	12,485	13,214	13,917	14,419	15,329	15,056	14,783	14,776	17,462	16,660
Foreign	2,297	2,338	2,684	3,695	3,636	4,874	5,982	6,719	7,465	7,687	8,353	9,016	9,108	8,848
Percent foreign	18.6	17.4	18.2	23.3	22.5	26.9	30.0	31.7	32.7	33.8	36.1	37.9	34.3	34.7
<b>Full-time senior faculty</b>														
<b>Total S&amp;E</b>	73,979	84,255	90,725	97,174	107,302	115,561	119,738	127,279	131,035	133,029	128,630	127,326	131,925	136,675
U.S.	64,212	73,093	79,268	83,002	91,548	98,427	101,257	108,285	110,908	113,460	108,382	107,380	109,940	113,235
Foreign	8,213	9,566	9,902	13,262	14,921	16,270	17,891	18,461	19,571	19,507	20,228	19,946	21,985	23,440
Percent foreign	11.3	11.6	11.1	13.8	14.0	14.2	15.0	14.6	15.0	14.7	15.7	16.7	17.2	
<b>Physical sciences</b>	13,029	14,597	15,280	15,955	16,839	17,122	17,705	18,336	17,751	17,566	16,915	16,408	16,671	16,644
U.S.	11,092	12,464	13,022	13,604	14,293	14,391	14,863	15,345	14,829	14,944	14,060	13,863	14,002	13,859
Foreign	1,605	1,809	1,894	2,210	2,386	2,534	2,742	2,884	2,820	2,600	2,855	2,545	2,668	2,786

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-24.

**U.S. and foreign-born doctoral scientists and engineers with U.S. doctorates at academic institutions, by type of position and field of degree: 1973–99**

Field of degree and place of birth	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
Percent foreign .....	12.3	12.4	12.4	13.9	14.2	14.8	15.5	15.7	15.9	14.8	16.9	15.5	16.0	16.7
<b>Mathematics</b> .....	5,926	6,900	7,639	8,293	9,080	9,724	10,012	10,538	10,904	11,799	11,465	10,589	10,843	10,776
U.S. ....	5,133	5,961	6,677	6,998	7,520	8,027	8,102	8,767	8,926	9,581	9,114	8,376	8,196	8,069
Foreign .....	665	818	811	1,177	1,443	1,597	1,826	1,710	1,924	2,218	2,351	2,213	2,646	2,707
Percent foreign .....	11.2	11.9	10.6	14.2	15.9	16.4	18.2	16.2	17.6	18.8	20.5	20.9	24.4	25.1
<b>Computer sciences</b> .....	NA	NA	NA	—	—	76	88	290	430	880	886	1,665	1,677	2,121
U.S. ....	NA	NA	NA	—	—	52	—	216	328	477	577	1,054	928	1,265
Foreign .....	NA	NA	NA	—	—	—	53	74	102	402	309	611	749	856
Percent foreign .....	NA	NA	NA	—	—	—	—	25.5	23.7	45.7	34.9	36.7	44.7	40.4
<b>Earth, atmospheric, and ocean sciences</b> .....	2,228	2,501	2,749	2,793	2,861	3,081	3,129	3,239	3,591	3,607	3,682	3,600	3,757	4,127
U.S. ....	2,049	2,243	2,419	2,444	2,479	2,644	2,713	2,864	3,091	3,285	3,250	3,166	3,201	3,581
Foreign .....	147	204	278	318	342	403	380	343	465	322	432	433	556	546
Percent foreign .....	6.6	8.2	10.1	11.4	12.0	13.1	12.1	10.6	12.9	8.9	11.7	12.0	14.8	13.2
<b>Life sciences</b> .....	20,973	23,392	24,573	27,006	29,565	32,632	33,697	35,809	36,416	37,444	35,829	37,181	38,311	40,640
U.S. ....	18,756	20,872	22,022	23,844	26,025	28,719	29,495	31,504	32,053	33,406	31,709	33,164	33,921	35,823
Foreign .....	1,688	1,970	2,119	2,860	3,249	3,651	3,979	4,122	4,160	4,027	4,120	4,018	4,390	4,817
Percent foreign .....	8.0	8.4	8.6	10.6	11.0	11.2	11.8	11.5	11.4	10.8	11.5	10.8	11.5	11.9
<b>Psychology</b> .....	7,250	8,683	9,062	9,868	11,682	12,845	13,507	14,303	14,991	15,337	14,261	14,521	15,300	15,644
U.S. ....	6,580	7,947	8,416	9,195	10,686	11,866	12,388	13,245	13,919	14,375	13,412	13,666	14,232	14,509
Foreign .....	535	579	530	598	924	902	1,025	1,016	994	932	829	855	1,068	1,135
Percent foreign .....	7.4	6.7	5.8	6.1	7.9	7.0	7.6	7.1	6.6	6.1	5.8	5.9	7.0	7.3
<b>Social sciences</b> .....	15,860	18,456	20,678	21,691	24,884	26,337	27,705	29,459	31,067	30,595	29,920	28,106	28,798	30,127
U.S. ....	13,536	15,708	17,925	18,121	20,929	22,211	23,316	25,159	26,388	26,218	25,373	23,893	24,142	25,050
Foreign .....	2,030	2,462	2,459	3,373	3,818	3,974	4,336	4,213	4,615	4,376	4,548	4,213	4,656	5,076
Percent foreign .....	12.8	13.3	11.9	15.6	15.3	15.1	15.7	14.3	14.9	14.3	15.2	15.0	16.2	16.8
<b>Engineering</b> .....	8,713	9,726	10,744	11,566	12,374	13,744	13,895	15,305	15,885	15,801	15,672	15,257	16,569	16,596
U.S. ....	7,066	7,898	8,787	8,794	9,601	10,517	10,345	11,185	11,374	11,173	10,888	10,198	11,318	11,078
Foreign .....	1,543	1,724	1,811	2,726	2,757	3,185	3,550	4,099	4,491	4,628	4,784	5,059	5,251	5,517
Percent foreign .....	17.7	17.7	16.9	23.6	22.3	23.2	25.5	26.8	28.3	29.3	30.5	33.2	31.7	33.2
<b>Full-time junior faculty</b>														
<b>Total S&amp;E</b> .....	29,317	32,095	34,896	34,025	34,629	32,840	37,159	37,163	38,729	40,100	43,775	44,045	46,438	47,368
U.S. ....	26,040	28,753	31,368	29,256	29,906	27,718	30,597	30,694	30,996	30,825	33,468	34,342	35,557	36,720
Foreign .....	3,196	3,218	3,412	4,738	4,631	5,024	6,383	6,368	7,584	9,183	10,300	9,703	10,881	10,647
Percent foreign .....	10.9	10.1	9.8	13.9	13.4	15.3	17.3	17.2	19.7	23.0	23.5	22.0	23.4	22.5
<b>Physical sciences</b> .....	4,800	4,341	4,765	4,011	3,658	3,058	3,516	3,623	3,729	4,095	4,341	4,465	4,774	5,083
U.S. ....	4,220	3,855	4,223	3,330	3,142	2,610	2,885	3,062	3,019	3,051	3,166	3,466	3,516	3,739
Foreign .....	556	467	512	681	516	448	626	557	695	1,044	1,175	999	1,258	1,344
Percent foreign .....	11.6	10.8	10.7	17.0	14.1	14.7	17.8	15.4	18.6	25.5	27.1	22.4	26.4	26.4
<b>Mathematics</b> .....	3,326	3,495	3,275	3,100	2,588	2,549	2,731	2,391	2,639	2,418	3,206	2,432	2,786	2,364
U.S. ....	2,958	3,137	2,994	2,577	2,082	1,916	2,064	1,865	1,671	1,339	1,747	1,517	1,802	1,710
Foreign .....	359	349	271	520	506	611	664	524	950	1,079	1,459	915	984	654
Percent foreign .....	10.8	10.0	8.3	16.8	19.6	24.0	24.3	21.9	36.0	44.6	45.5	37.6	35.3	27.7
<b>Computer sciences</b> .....	NA	NA	NA	57	237	334	577	598	904	965	1,422	1,179	1,277	1,186
U.S. ....	NA	NA	NA	—	170	250	411	399	473	510	740	588	683	760
Foreign .....	NA	NA	NA	—	67	84	166	199	431	455	682	591	594	426
Percent foreign .....	NA	NA	NA	—	28.3	25.1	28.8	33.3	47.7	47.2	48.0	50.1	46.5	35.9

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-24.

**U.S. and foreign-born doctoral scientists and engineers with U.S. doctorates at academic institutions, by type of position and field of degree: 1973-99**

Field of degree and place of birth	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Earth, atmospheric, and ocean sciences</b>														
ocean sciences .....	775	931	877	703	932	884	1,068	1,123	1,111	922	863	1,080	1,302	1,468
U.S. ....	694	823	786	628	830	809	922	979	930	763	623	881	1,055	1,271
Foreign .....	81	108	91	75	94	75	144	144	179	159	240	199	247	196
Percent foreign.....	10.5	11.6	10.4	10.7	10.1	8.5	13.5	12.8	16.1	17.2	27.8	18.4	18.9	13.4
<b>Life sciences</b> .....	8,533	9,660	10,313	10,304	11,325	10,847	11,900	12,311	12,849	13,655	14,974	15,614	16,896	17,499
U.S. ....	7,719	8,665	9,495	8,833	9,930	9,667	10,578	10,737	11,275	11,605	12,723	13,203	13,871	13,895
Foreign .....	788	948	784	1,452	1,343	1,127	1,257	1,526	1,503	2,034	2,251	2,410	3,026	3,603
Percent foreign.....	9.2	9.8	7.6	14.1	11.9	10.4	10.6	12.4	11.7	14.9	15.0	15.4	17.9	20.6
<b>Psychology</b> .....	3,578	4,159	4,806	4,434	4,763	4,460	4,950	4,936	5,217	5,405	5,212	5,534	5,497	6,222
U.S. ....	3,403	3,964	4,492	4,124	4,516	4,218	4,620	4,628	4,773	5,019	4,781	5,092	5,020	5,695
Foreign .....	160	183	301	305	238	226	290	271	416	320	431	442	477	527
Percent foreign.....	4.5	4.4	6.3	6.9	5.0	5.1	5.9	5.5	8.0	5.9	8.3	8.0	8.7	8.5
<b>Social sciences</b> .....	5,735	7,056	8,152	8,649	8,797	8,053	8,404	8,181	7,939	8,378	9,280	8,962	8,933	9,073
U.S. ....	4,997	6,258	7,147	7,599	7,529	6,751	7,025	6,863	6,566	6,264	7,301	6,808	6,621	6,867
Foreign .....	731	761	976	1,046	1,245	1,299	1,335	1,318	1,360	2,114	1,979	2,153	2,311	2,206
Percent foreign.....	12.7	10.8	12.0	12.1	14.2	16.1	15.9	16.1	17.1	25.2	21.3	24.0	25.9	24.3
<b>Engineering</b> .....	2,570	2,453	2,708	2,767	2,329	2,655	4,013	4,000	4,341	4,263	4,478	4,779	4,974	4,474
U.S. ....	2,049	2,051	2,231	2,129	1,707	1,497	2,092	2,161	2,289	2,275	2,388	2,787	2,990	2,783
Foreign .....	521	402	477	638	622	1,154	1,901	1,829	2,050	1,978	2,082	1,993	1,984	1,691
Percent foreign.....	20.3	16.4	17.6	23.1	26.7	43.5	47.4	45.7	47.2	46.4	46.5	41.7	39.9	37.8
<b>Full-time other</b>														
<b>Total S&amp;E</b> .....	7,570	8,272	8,820	11,419	12,592	13,377	18,100	16,413	19,188	20,202	22,168	23,854	26,389	29,335
U.S. ....	6,382	7,253	7,574	9,876	10,813	10,983	15,372	13,705	16,004	16,709	18,564	19,041	21,808	23,688
Foreign .....	1,042	880	1,159	1,513	1,711	2,324	2,662	2,675	3,091	3,483	3,604	4,813	4,582	5,647
Percent foreign.....	14.0	10.8	13.3	13.3	13.7	17.5	14.8	16.3	16.2	17.2	16.3	20.2	17.4	19.2
<b>Physical sciences</b> .....	1,939	1,926	2,111	1,990	2,387	2,535	3,015	2,633	3,282	3,223	3,670	3,822	4,627	5,566
U.S. ....	1,590	1,691	1,860	1,683	2,027	1,989	2,593	2,066	2,607	2,597	2,759	2,930	3,595	4,441
Foreign .....	337	232	248	306	357	546	416	561	671	626	911	891	1,033	1,125
Percent foreign.....	17.4	12.0	11.7	15.4	15.0	21.5	13.8	21.3	20.4	19.4	24.8	23.3	22.3	20.2
<b>Mathematics</b> .....	232	335	436	358	372	299	510	445	486	649	456	613	813	761
U.S. ....	178	266	367	280	318	282	489	300	402	373	344	423	661	505
Foreign .....	—	52	69	78	—	—	—	145	84	277	112	190	152	256
Percent foreign.....	—	15.5	15.8	21.8	—	—	—	32.6	17.3	42.6	24.6	31.0	18.7	33.6
<b>Computer sciences</b> .....	NA	NA	NA	—	—	56	99	143	127	103	180	219	179	266
U.S. ....	NA	NA	NA	—	—	—	66	112	120	101	142	135	143	183
Foreign .....	NA	NA	NA	—	—	—	—	—	—	—	—	84	—	83
Percent foreign.....	NA	NA	NA	—	—	—	—	—	—	—	—	38.3	—	31.2
<b>Earth, atmospheric, and ocean sciences</b> .....	293	284	339	506	499	512	702	772	694	900	1,100	1,078	1,424	1,376
U.S. ....	264	256	312	437	460	436	570	636	598	822	1,004	818	1,152	1,032
Foreign .....	—	—	—	69	—	76	125	136	87	78	96	260	272	344
Percent foreign.....	—	—	—	13.6	—	14.8	17.8	17.6	12.5	8.6	8.7	24.1	19.1	25.0
<b>Life sciences</b> .....	2,536	2,354	2,759	3,871	4,022	4,564	6,166	5,968	6,716	7,231	7,668	8,441	8,369	9,482
U.S. ....	2,077	2,022	2,220	3,122	3,162	3,602	5,215	4,995	5,524	6,010	6,473	6,857	6,998	7,507
Foreign .....	402	291	499	720	809	895	917	951	1,151	1,222	1,195	1,584	1,371	1,976
Percent foreign.....	15.9	12.4	18.1	18.6	20.1	19.6	14.9	15.9	17.1	16.9	15.6	18.8	16.4	20.8

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-24.

**U.S. and foreign-born doctoral scientists and engineers with U.S. doctorates at academic institutions, by type of position and field of degree:  
1973–99**

Field of degree and place of birth	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Psychology</b>	813	1,032	1,202	1,846	2,239	2,151	2,870	2,804	2,931	2,810	3,895	3,925	4,037	4,601
U.S.	755	954	1,159	1,727	2,076	1,959	2,671	2,585	2,767	2,562	3,565	3,564	3,722	4,285
Foreign	—	—	—	119	163	192	199	214	164	249	330	360	315	316
Percent foreign	—	—	—	6.4	7.3	8.9	6.9	7.6	5.6	8.8	8.5	9.2	7.8	6.9
<b>Social sciences</b>	991	1,461	1,193	1,932	1,976	2,196	3,221	2,578	3,463	3,524	3,687	3,624	3,881	4,310
U.S.	887	1,303	1,038	1,829	1,754	1,929	2,632	2,278	2,973	3,161	3,295	3,096	3,283	3,551
Foreign	77	135	131	103	219	267	582	300	451	362	393	528	598	759
Percent foreign	7.8	9.2	11.0	5.3	11.1	12.2	18.1	11.6	13.0	10.3	10.7	14.6	15.4	17.6
<b>Engineering</b>	766	880	780	916	1,093	1,064	1,517	1,070	1,489	1,761	1,513	2,133	3,060	2,972
U.S.	631	761	618	798	1,016	767	1,136	733	1,013	1,084	982	1,217	2,255	2,184
Foreign	135	97	148	118	77	297	379	337	476	668	530	916	806	788
Percent foreign	17.6	11.0	19.0	12.9	7.0	27.9	25.0	31.5	32.0	37.9	35.1	42.9	26.3	26.5
<b>Postdoctorates</b>														
<b>Total S&amp;E</b>	4,159	6,190	7,630	8,149	8,526	8,282	8,673	9,332	11,500	9,859	13,335	16,840	18,868	18,546
U.S.	3,404	4,840	6,018	6,462	6,643	6,719	6,801	6,694	8,327	6,630	8,131	10,445	11,400	11,155
Foreign	725	1,321	1,580	1,661	1,861	1,520	1,837	2,594	3,125	3,220	5,204	6,395	7,468	7,392
Percent foreign	17.6	21.4	20.8	20.4	21.9	18.4	21.3	27.9	27.3	32.7	39.0	38.0	39.6	39.9
<b>Physical sciences</b>	1,660	2,122	2,205	1,918	1,867	1,426	1,895	1,958	2,402	1,870	3,035	3,931	3,167	2,928
U.S.	1,323	1,653	1,683	1,396	1,271	1,087	1,215	1,054	1,360	998	1,624	2,087	1,586	1,519
Foreign	325	456	509	515	594	333	677	904	1,036	872	1,411	1,843	1,582	1,410
Percent foreign	19.6	21.5	23.1	26.9	31.8	23.4	35.7	46.2	43.1	46.6	46.5	46.9	49.9	48.1
<b>Mathematics</b>	—	73	81	146	102	101	83	261	192	59	—	455	457	587
U.S.	—	63	60	125	86	97	65	95	98	—	—	171	211	253
Foreign	—	—	—	—	—	—	—	166	94	59	—	283	246	334
Percent foreign	—	—	—	—	—	—	—	63.6	49.0	—	—	62.3	53.7	56.8
<b>Computer sciences</b>	NA	NA	NA	—	—	—	—	—	—	—	—	80	111	70
U.S.	NA	NA	NA	—	—	—	—	—	—	—	—	—	—	60
Foreign	NA	NA	NA	—	—	—	—	—	—	—	—	—	64	—
Percent foreign	NA	NA	NA	—	—	—	—	—	—	—	—	—	—	—
<b>Earth, atmospheric, and ocean sciences</b>	72	92	166	134	185	185	176	271	263	342	496	468	620	523
U.S.	55	55	129	119	137	145	129	215	202	192	316	282	378	444
Foreign	—	—	—	—	—	—	—	—	—	151	180	185	242	79
Percent foreign	—	—	—	—	—	—	—	—	—	44.0	36.4	39.6	39.1	15.0
<b>Life sciences</b>	1,912	3,027	3,972	4,670	5,241	5,093	5,245	5,555	6,829	6,355	8,154	9,190	10,826	11,684
U.S.	1,614	2,360	3,208	3,872	4,251	4,259	4,289	4,465	5,409	4,685	5,478	6,199	6,742	7,024
Foreign	280	651	749	779	974	802	929	1,054	1,391	1,671	2,677	2,991	4,085	4,660
Percent foreign	14.6	21.5	18.9	16.7	18.6	15.7	17.7	19.0	20.4	26.3	32.8	32.5	37.7	39.9
<b>Psychology</b>	159	379	497	610	637	569	739	656	844	474	406	1,074	1,344	1,180
U.S.	145	369	473	591	588	540	722	621	810	411	341	989	1,136	1,048
Foreign	—	—	—	—	—	—	—	—	—	63	66	84	208	133
Percent foreign	—	—	—	—	—	—	—	—	—	13.2	16.2	7.8	15.5	11.3
<b>Social sciences</b>	132	243	320	329	296	588	348	129	366	285	165	432	688	484
U.S.	121	189	288	192	273	477	338	113	248	200	81	331	569	371
Foreign	—	54	—	137	—	111	—	—	118	86	84	101	119	113
Percent foreign	—	22.2	—	41.6	—	18.9	—	—	32.2	30.0	51.1	23.4	17.3	23.4

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-24.

**U.S. and foreign-born doctoral scientists and engineers with U.S. doctorates at academic institutions, by type of position and field of degree:  
1973-99**

Field of degree and place of birth	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Engineering .....</b>	183	254	389	321	176	318	185	485	581	474	1,001	1,211	1,654	1,090
U.S. ....	107	151	177	158	—	112	—	116	200	145	236	337	731	436
Foreign .....	76	103	212	163	146	206	142	369	381	320	765	874	923	654
Percent foreign.....	41.5	40.6	54.5	50.8	—	64.8	—	76.1	65.6	67.5	76.4	72.2	55.8	60.0
<b>Part-time total</b>														
<b>Total S&amp;E .....</b>	2,932	3,239	3,374	4,547	4,019	6,022	6,548	5,709	6,167	7,390	5,850	5,478	8,885	8,245
U.S. ....	2,489	2,844	2,950	3,943	3,443	5,364	5,441	4,935	5,525	6,503	4,716	4,556	7,253	6,361
Foreign .....	355	308	352	534	523	547	951	704	607	867	1,134	922	1,633	1,884
Percent foreign.....	12.5	9.8	10.7	11.9	13.2	9.3	14.9	12.5	9.9	11.8	19.4	16.8	18.4	22.9
<b>Physical sciences .....</b>	636	599	591	749	585	992	875	619	528	926	683	725	972	727
U.S. ....	521	510	512	600	471	900	609	516	440	799	420	471	649	433
Foreign .....	93	73	50	131	106	92	222	97	82	128	263	254	322	294
Percent foreign.....	14.6	12.2	8.5	17.5	18.1	9.3	25.4	15.7	15.5	13.8	38.5	35.1	33.2	40.4
<b>Mathematics .....</b>	139	225	240	299	235	247	226	178	269	299	304	510	657	692
U.S. ....	131	197	197	237	210	204	158	141	243	287	202	385	456	419
Foreign .....	—	—	—	62	—	—	51	—	—	—	102	124	201	273
Percent foreign.....	—	—	—	20.7	—	—	22.6	—	—	—	33.7	24.4	30.6	39.5
<b>Computer science .....</b>	NA	NA	NA	—	—	—	—	—	—	—	—	—	82	58
U.S. ....	NA	NA	NA	—	—	—	—	—	—	—	—	—	77	53
Foreign .....	NA	NA	NA	—	—	—	—	—	—	—	—	—	—	—
Percent foreign.....	NA	NA	NA	—	—	—	—	—	—	—	—	—	—	—
<b>Earth, atmospheric, and ocean sciences .....</b>	52	91	73	100	104	143	171	173	202	279	295	194	224	297
U.S. ....	—	76	62	93	95	130	153	159	184	217	248	180	158	225
Foreign .....	—	—	—	—	—	—	—	—	—	62	—	—	66	73
Percent foreign.....	—	—	—	—	—	—	—	—	—	22.4	—	—	29.4	24.5
<b>Life sciences .....</b>	900	932	984	1,156	1,169	1,689	1,671	1,604	1,945	2,252	1,569	1,190	2,897	2,557
U.S. ....	762	843	861	1,046	996	1,467	1,407	1,391	1,753	2,097	1,406	1,056	2,473	2,134
Foreign .....	118	83	106	99	131	170	219	195	180	156	163	134	424	422
Percent foreign.....	13.1	8.9	10.8	8.6	11.2	10.1	13.1	12.2	9.3	6.9	10.4	11.3	14.6	16.5
<b>Psychology .....</b>	409	515	599	969	796	987	1,028	1,038	1,020	1,149	1,190	1,095	1,140	1,322
U.S. ....	382	454	540	851	702	893	876	986	941	1,026	1,129	1,073	1,121	1,254
Foreign .....	—	—	—	95	94	84	141	—	79	123	61	—	—	69
Percent foreign.....	—	—	—	9.8	11.8	8.5	13.7	—	7.7	10.7	5.1	—	—	5.2
<b>Social sciences .....</b>	658	769	751	999	961	1,591	2,231	1,766	1,664	2,004	1,324	1,346	2,601	2,216
U.S. ....	527	668	678	891	834	1,429	1,918	1,496	1,501	1,691	1,024	1,154	2,150	1,665
Foreign .....	99	60	68	90	127	121	290	245	163	293	300	192	451	551
Percent foreign.....	15.0	7.8	9.1	9.0	13.2	7.6	13.0	13.9	9.8	14.6	22.7	14.3	17.3	24.9
<b>Engineering .....</b>	138	108	136	275	169	353	327	309	529	472	480	413	313	376
U.S. ....	116	96	100	225	135	321	301	224	453	379	288	238	168	178
Foreign .....	—	—	—	50	—	—	—	85	67	93	192	175	144	197
Percent foreign.....	—	—	—	18.2	—	—	—	27.5	12.7	19.7	40.0	42.4	46.2	52.5

NA = not available; — = sample too small

NOTES: Excludes those with foreign-earned doctorates. Small number of unknowns through 1987 not shown.

SOURCE: National Science Foundation, Division of Science Resources Studies (NSF/SRS), Survey of Doctorate Recipients, unpublished tabulations.

Appendix table 5-25.

**Doctoral academic scientists and engineers, by type of position and Carnegie classification and administrative control of institution: 1973–99**

(Thousands)

Year	All academic institutions	Research universities	Doctorate-granting	Comprehensive	Medical schools	Liberal arts colleges
<b>Total public and private institutions</b>						
<b>All positions</b>						
1973 .....	118.0	65.2	14.0	21.3	3.3	8.8
1975 .....	134.1	73.4	15.9	24.8	4.3	10.4
1977 .....	145.4	78.2	17.2	26.5	4.9	10.8
1979 .....	155.3	83.5	17.2	26.9	5.9	11.3
1981 .....	167.1	91.0	18.8	30.5	7.2	12.0
1983 .....	176.1	89.9	19.5	31.6	7.0	12.6
1985 .....	190.2	102.8	21.2	35.6	8.3	14.0
1987 .....	195.9	106.9	22.2	36.0	9.0	14.6
1989 .....	206.6	112.5	23.5	38.4	9.7	15.3
1991 .....	210.6	111.6	24.9	39.5	9.6	15.8
1993 .....	213.8	113.0	24.2	39.5	10.8	16.0
1995 .....	217.5	112.8	25.0	41.5	11.2	15.8
1997 .....	232.5	113.6	25.8	42.0	9.8	17.3
1999 .....	240.2	117.2	26.3	43.6	11.9	18.5
<b>Full-time senior faculty</b>						
1973 .....	74.0	41.0	9.3	14.5	1.6	5.6
1975 .....	84.3	45.6	10.9	17.0	2.0	6.3
1977 .....	90.7	48.0	11.6	18.9	2.2	6.6
1979 .....	97.2	50.0	11.6	19.5	2.6	7.2
1981 .....	107.3	55.6	13.4	22.5	3.6	8.1
1983 .....	115.6	56.2	14.5	24.0	3.8	8.4
1985 .....	119.7	61.0	15.0	26.3	4.0	9.3
1987 .....	127.3	65.0	16.4	27.5	4.6	10.3
1989 .....	131.0	66.4	16.4	28.7	4.8	10.8
1991 .....	133.0	65.6	17.0	29.8	4.7	11.2
1993 .....	128.6	62.6	16.2	29.0	5.3	10.9
1995 .....	127.3	61.1	16.0	29.1	5.1	10.7
1997 .....	131.9	61.5	16.9	28.4	4.3	11.1
1999 .....	136.7	64.2	17.4	29.6	5.7	12.3
<b>Full-time junior faculty</b>						
1973 .....	29.3	14.7	3.8	5.8	1.2	2.5
1975 .....	32.1	15.9	3.8	6.1	1.6	3.1
1977 .....	34.9	16.7	4.4	6.3	1.9	3.3
1979 .....	34.0	17.1	4.2	5.6	2.1	2.9
1981 .....	34.6	18.1	3.9	6.3	2.0	2.7
1983 .....	32.8	16.0	3.5	5.2	1.9	2.9
1985 .....	37.2	19.7	3.6	6.0	2.5	3.2
1987 .....	37.2	19.3	3.9	6.3	2.6	3.1
1989 .....	38.7	20.2	4.4	6.5	2.9	3.1
1991 .....	40.1	20.2	5.1	6.8	3.1	2.9
1993 .....	43.8	21.8	5.4	7.4	3.2	3.7
1995 .....	44.0	20.5	5.6	8.2	3.3	3.9
1997 .....	46.4	20.0	5.1	9.2	3.1	4.4
1999 .....	47.4	20.0	5.4	9.9	3.1	4.5
<b>Full-time nonfaculty except postdoctorates</b>						
1973 .....	7.6	4.6	0.4	0.5	0.2	0.4
1975 .....	8.3	5.1	0.6	1.0	0.2	0.6
1977 .....	8.8	5.6	0.5	0.6	0.2	0.5
1979 .....	11.4	7.5	0.8	0.9	0.4	0.7
1981 .....	12.6	8.1	0.8	1.1	0.4	0.8
1983 .....	13.4	8.1	0.7	1.1	0.6	0.7
1985 .....	18.1	11.7	1.6	2.0	0.7	0.9
1987 .....	16.4	11.5	1.1	1.3	0.7	0.7
1989 .....	19.2	13.2	1.3	1.9	1.0	0.8
1991 .....	20.2	13.9	1.7	1.5	0.7	1.0
1993 .....	22.2	14.6	1.7	1.9	1.1	0.9
1995 .....	23.9	15.7	1.9	2.2	1.2	0.8
1997 .....	26.4	15.1	1.9	2.0	0.8	0.9
1999 .....	29.3	16.4	2.0	2.2	1.0	0.9

See explanatory notes, if any, and SOURCE, at end of table.

Appendix table 5-25.

**Doctoral academic scientists and engineers, by type of position and Carnegie classification and administrative control of institution: 1973–99**

(Thousands)

Year	All academic institutions	Research universities	Doctorate-granting	Comprehensive	Medical schools	Liberal arts colleges
<b>Postdoctorates</b>						
1973 .....	4.2	3.5	0.2	0.1	0.2	0.0
1975 .....	6.2	5.3	0.2	0.1	0.4	0.0
1977 .....	7.6	6.5	0.3	0.1	0.5	0.1
1979 .....	8.1	6.8	0.3	0.2	0.6	0.1
1981 .....	8.5	7.0	0.3	0.1	1.1	0.0
1983 .....	8.3	6.7	0.2	0.3	0.6	0.0
1985 .....	8.7	7.4	0.3	0.0	0.8	0.1
1987 .....	9.3	8.1	0.2	0.0	0.8	0.0
1989 .....	11.5	9.7	0.5	0.1	0.9	0.1
1991 .....	9.9	8.3	0.3	0.2	0.8	0.0
1993 .....	13.3	11.3	0.5	0.1	1.1	0.0
1995 .....	16.8	13.6	0.8	0.4	1.4	0.1
1997 .....	18.9	13.9	0.9	0.6	1.4	0.1
1999 .....	18.5	14.1	0.8	0.1	1.7	0.2
<b>Part-time positions</b>						
1973 .....	2.9	1.5	0.3	0.4	0.1	0.3
1975 .....	3.2	1.5	0.4	0.5	0.2	0.3
1977 .....	3.4	1.5	0.4	0.6	0.1	0.3
1979 .....	4.5	2.1	0.4	0.8	0.2	0.5
1981 .....	4.0	2.1	0.3	0.6	0.1	0.4
1983 .....	6.0	2.9	0.5	1.0	0.2	0.6
1985 .....	6.5	3.1	0.6	1.2	0.3	0.6
1987 .....	5.7	3.0	0.6	0.9	0.3	0.5
1989 .....	6.2	3.0	0.9	1.2	0.2	0.4
1991 .....	7.4	3.6	0.8	1.2	0.3	0.8
1993 .....	5.9	2.7	0.5	1.0	0.1	0.4
1995 .....	5.5	1.8	0.7	1.6	0.2	0.3
1997 .....	8.9	3.1	1.0	1.7	0.2	0.7
1999 .....	8.2	2.6	0.7	1.8	0.4	0.6
<b>Public universities and colleges</b>						
<b>All positions</b>						
1973 .....	80.9	48.8	10.2	16.2	2.3	1.0
1975 .....	93.0	54.8	11.4	18.8	3.1	1.3
1977 .....	100.4	58.6	12.2	20.4	3.6	1.5
1979 .....	104.3	62.9	11.8	19.9	4.3	1.5
1981 .....	113.9	66.7	13.3	22.4	5.4	1.7
1983 .....	115.9	66.6	13.7	23.6	5.2	1.9
1985 .....	130.2	75.3	15.0	26.2	5.9	2.2
1987 .....	135.3	79.0	15.3	26.8	6.1	2.5
1989 .....	141.2	81.7	16.5	28.2	6.6	2.7
1991 .....	142.6	80.8	17.3	28.4	6.8	2.6
1993 .....	144.6	81.9	16.9	28.9	7.4	2.6
1995 .....	145.7	80.8	17.7	30.2	7.7	2.4
1997 .....	148.7	82.9	18.4	31.0	6.4	3.0
1999 .....	153.1	83.6	18.5	31.5	8.2	2.7
<b>Full-time senior faculty</b>						
1973 .....	52.4	31.8	6.9	11.0	1.1	0.6
1975 .....	60.2	35.4	8.1	12.9	1.4	0.7
1977 .....	65.2	37.7	8.5	14.6	1.6	0.9
1979 .....	66.9	39.2	8.1	14.7	1.9	1.0
1981 .....	76.2	43.3	9.7	17.0	2.7	1.2
1983 .....	79.7	44.3	10.4	18.2	2.9	1.3
1985 .....	85.0	47.2	10.6	19.8	3.0	1.5
1987 .....	90.7	50.7	11.6	20.5	3.3	1.8
1989 .....	92.6	51.5	11.6	21.3	3.3	1.8
1991 .....	93.7	50.8	12.1	21.9	3.5	2.0
1993 .....	90.6	48.5	11.6	21.5	3.8	2.0
1995 .....	88.7	47.1	11.6	21.4	3.7	1.6
1997 .....	89.8	48.3	12.3	21.0	3.0	2.0
1999 .....	92.5	48.7	12.5	21.6	4.0	1.9

See explanatory notes, if any, and SOURCE, at end of table.

Appendix table 5-25.

**Doctoral academic scientists and engineers, by type of position and Carnegie classification and administrative control of institution: 1973–99**

(Thousands)

Year	All academic institutions	Research universities	Doctorate-granting	Comprehensive	Medical schools	Liberal arts colleges
<b>Full-time junior faculty</b>						
1973 .....	20.4	11.0	2.7	4.5	0.9	0.3
1975 .....	22.1	11.8	2.6	4.9	1.2	0.4
1977 .....	23.7	12.4	2.9	4.9	1.4	0.4
1979 .....	22.4	12.8	2.8	3.8	1.4	0.3
1981 .....	22.7	12.5	2.7	4.2	1.5	0.4
1983 .....	20.2	11.2	2.3	3.7	1.3	0.5
1985 .....	24.1	13.9	2.5	4.1	1.6	0.4
1987 .....	25.0	14.0	2.6	4.5	1.6	0.5
1989 .....	25.4	14.2	3.1	4.6	1.8	0.5
1991 .....	25.8	13.7	3.5	4.6	2.0	0.5
1993 .....	27.9	14.9	3.6	5.2	2.1	0.5
1995 .....	28.3	14.0	3.8	6.0	2.4	0.6
1997 .....	28.2	13.7	3.7	6.6	1.9	0.7
1999 .....	29.4	13.8	3.7	7.1	2.0	0.6
<b>Full-time nonfaculty except postdoctorates</b>						
1973 .....	4.1	3.0	0.3	0.4	0.2	0.0
1975 .....	5.2	3.3	0.4	0.7	0.1	0.1
1977 .....	5.1	3.7	0.3	0.4	0.2	0.1
1979 .....	7.4	5.1	0.6	0.8	0.4	0.1
1981 .....	8.0	5.4	0.6	0.9	0.3	0.1
1983 .....	7.8	5.4	0.5	0.9	0.4	0.1
1985 .....	11.9	7.9	1.3	1.4	0.4	0.2
1987 .....	10.2	7.3	0.7	1.0	0.4	0.2
1989 .....	12.5	8.5	0.9	1.4	0.7	0.2
1991 .....	13.4	9.4	1.1	1.3	0.5	0.1
1993 .....	14.1	9.4	1.0	1.4	0.8	0.1
1995 .....	15.3	10.2	1.3	1.7	0.8	0.1
1997 .....	15.4	10.7	1.4	1.6	0.5	0.2
1999 .....	16.5	11.5	1.3	1.6	0.6	0.2
<b>Postdoctorates</b>						
1973 .....	2.3	2.0	0.1	0.1	0.1	0.0
1975 .....	3.6	3.1	0.1	0.1	0.3	0.0
1977 .....	4.4	3.8	0.2	0.0	0.3	0.0
1979 .....	4.8	4.1	0.1	0.1	0.5	0.0
1981 .....	4.8	3.9	0.1	0.1	0.8	0.0
1983 .....	4.6	3.7	0.2	0.2	0.4	0.0
1985 .....	4.7	4.0	0.2	0.0	0.6	0.0
1987 .....	5.3	4.5	0.1	0.0	0.5	0.0
1989 .....	6.4	5.3	0.3	0.1	0.6	0.1
1991 .....	5.3	4.3	0.2	0.2	0.5	0.0
1993 .....	8.2	7.0	0.4	0.1	0.7	0.0
1995 .....	9.9	8.1	0.5	0.3	0.8	0.0
1997 .....	9.8	8.0	0.5	0.5	0.8	0.0
1999 .....	9.9	7.9	0.6	0.1	1.2	0.0
<b>Part-time positions</b>						
1973 .....	1.6	1.0	0.2	0.2	0.1	0.0
1975 .....	2.0	1.1	0.2	0.3	0.1	0.0
1977 .....	2.1	1.1	0.2	0.4	0.1	0.0
1979 .....	2.8	1.6	0.2	0.5	0.1	0.0
1981 .....	2.3	1.5	0.2	0.3	0.1	0.0
1983 .....	3.7	2.0	0.4	0.7	0.2	0.0
1985 .....	4.4	2.3	0.4	0.9	0.2	0.1
1987 .....	4.1	2.5	0.3	0.7	0.2	0.0
1989 .....	4.2	2.3	0.6	0.8	0.2	0.1
1991 .....	4.4	2.6	0.4	0.5	0.2	0.1
1993 .....	3.9	2.0	0.2	0.6	0.1	0.1
1995 .....	3.5	1.4	0.4	0.9	0.0	0.0
1997 .....	5.6	2.3	0.5	1.3	0.1	0.1
1999 .....	4.9	1.7	0.3	1.2	0.3	0.1

See explanatory notes, if any, and SOURCE, at end of table.

Appendix table 5-25.

**Doctoral academic scientists and engineers, by type of position and Carnegie classification and administrative control of institution: 1973–99**  
 (Thousands)

Year	All academic institutions	Research universities	Doctorate-granting	Comprehensive	Medical schools	Liberal arts colleges
<b>Private universities and colleges</b>						
<b>All positions</b>						
1973 .....	34.7	16.4	3.8	5.1	0.9	7.8
1975 .....	40.0	18.6	4.5	5.9	1.2	9.1
1977 .....	42.2	19.6	5.0	6.2	1.3	9.3
1979 .....	45.0	20.6	5.4	7.0	1.5	9.8
1981 .....	51.0	24.4	5.5	8.2	1.8	10.4
1983 .....	50.3	23.2	5.8	8.0	1.8	10.6
1985 .....	58.3	27.5	6.2	9.4	2.3	11.8
1987 .....	60.2	27.9	6.9	9.2	2.9	12.1
1989 .....	65.1	30.8	7.1	10.1	3.1	12.6
1991 .....	67.0	30.8	7.5	11.1	2.8	13.2
1993 .....	67.1	31.1	7.3	10.6	3.4	13.4
1995 .....	68.7	32.0	7.3	11.2	3.4	13.4
1997 .....	68.8	30.7	7.4	11.0	3.5	14.3
1999 .....	74.8	33.6	7.9	12.1	3.7	15.8
<b>Full-time senior faculty</b>						
1973 .....	21.0	9.3	2.4	3.5	0.4	5.0
1975 .....	23.6	10.1	2.8	4.1	0.5	5.6
1977 .....	24.3	10.3	3.1	4.3	0.6	5.6
1979 .....	26.2	10.7	3.4	4.8	0.7	6.1
1981 .....	29.8	12.4	3.7	5.5	0.9	6.9
1983 .....	30.2	11.9	4.1	5.8	0.9	7.1
1985 .....	34.0	13.7	4.4	6.5	1.0	7.8
1987 .....	36.4	14.2	4.8	7.0	1.3	8.5
1989 .....	38.3	14.9	4.8	7.4	1.4	9.0
1991 .....	39.1	14.8	4.9	8.0	1.3	9.2
1993 .....	37.2	14.1	4.6	7.5	1.5	8.9
1995 .....	37.3	14.1	4.4	7.7	1.5	9.1
1997 .....	36.6	13.3	4.5	7.4	1.2	9.1
1999 .....	41.3	15.5	4.9	8.0	1.6	10.4
<b>full-time junior faculty</b>						
1973 .....	8.7	3.7	1.1	1.2	0.4	2.1
1975 .....	9.8	4.1	1.3	1.3	0.4	2.7
1977 .....	10.8	4.2	1.5	1.4	0.5	2.9
1979 .....	10.7	4.3	1.4	1.8	0.6	2.6
1981 .....	11.7	5.6	1.2	2.1	0.5	2.3
1983 .....	10.6	4.8	1.2	1.5	0.5	2.4
1985 .....	12.6	5.8	1.1	1.9	0.8	2.8
1987 .....	12.0	5.3	1.3	1.8	1.0	2.5
1989 .....	13.2	6.1	1.3	1.9	1.1	2.6
1991 .....	14.1	6.5	1.6	2.2	1.0	2.4
1993 .....	15.5	6.9	1.7	2.2	1.1	3.2
1995 .....	15.1	6.5	1.7	2.2	1.0	3.4
1997 .....	15.7	6.3	1.4	2.6	1.2	3.8
1999 .....	16.1	6.1	1.7	2.9	1.1	3.9
<b>Full-time nonfaculty except postdoctorates</b>						
1973 .....	2.3	1.6	0.1	0.2	0.1	0.3
1975 .....	2.9	1.8	0.2	0.3	0.1	0.5
1977 .....	2.9	1.9	0.2	0.2	0.1	0.4
1979 .....	3.4	2.4	0.2	0.2	0.0	0.6
1981 .....	4.3	2.7	0.2	0.2	0.1	0.7
1983 .....	4.2	2.7	0.2	0.3	0.1	0.6
1985 .....	5.9	3.8	0.3	0.7	0.2	0.7
1987 .....	6.1	4.3	0.5	0.2	0.3	0.6
1989 .....	6.6	4.7	0.4	0.5	0.2	0.6
1991 .....	6.6	4.5	0.6	0.2	0.2	0.9
1993 .....	7.7	5.2	0.7	0.5	0.3	0.8
1995 .....	7.8	5.5	0.6	0.5	0.4	0.6
1997 .....	6.6	4.4	0.5	0.5	0.3	0.6
1999 .....	7.4	4.9	0.6	0.6	0.4	0.7

See explanatory notes, if any, and SOURCE, at end of table.

Appendix table 5-25.

**Doctoral academic scientists and engineers, by type of position and Carnegie classification and administrative control of institution: 1973–99**

(Thousands)

Year	All academic institutions	Research universities	Doctorate-granting	Comprehensive	Medical schools	Liberal arts colleges
<b>Postdoctorates</b>						
1973 .....	1.6	1.4	0.1	0.0	0.0	0.0
1975 .....	2.5	2.1	0.1	0.0	0.2	0.0
1977 .....	3.2	2.8	0.1	0.0	0.2	0.1
1979 .....	3.2	2.7	0.2	0.1	0.2	0.1
1981 .....	3.7	3.1	0.3	0.0	0.3	0.0
1983 .....	3.3	2.9	0.1	0.0	0.2	0.0
1985 .....	3.8	3.4	0.1	0.0	0.2	0.1
1987 .....	4.0	3.6	0.1	0.0	0.3	0.0
1989 .....	5.0	4.4	0.2	0.0	0.3	0.1
1991 .....	4.5	4.0	0.1	0.0	0.3	0.0
1993 .....	4.9	4.3	0.1	0.0	0.4	0.0
1995 .....	6.6	5.5	0.3	0.1	0.5	0.1
1997 .....	7.4	5.9	0.5	0.1	0.7	0.1
1999 .....	7.1	6.2	0.2	0.1	0.5	0.2
<b>Part-time positions</b>						
1973 .....	1.1	0.5	0.1	0.2	0.0	0.2
1975 .....	1.2	0.4	0.2	0.2	0.0	0.3
1977 .....	1.1	0.4	0.2	0.2	0.0	0.2
1979 .....	1.5	0.5	0.2	0.2	0.1	0.4
1981 .....	1.6	0.6	0.2	0.3	0.0	0.4
1983 .....	2.0	0.9	0.2	0.3	0.1	0.5
1985 .....	1.9	0.8	0.2	0.2	0.1	0.4
1987 .....	1.6	0.5	0.3	0.2	0.1	0.4
1989 .....	1.9	0.8	0.3	0.4	0.0	0.4
1991 .....	2.8	1.0	0.3	0.7	0.1	0.6
1993 .....	1.8	0.6	0.3	0.4	0.1	0.4
1995 .....	1.8	0.4	0.3	0.7	0.1	0.2
1997 .....	2.6	0.9	0.5	0.5	0.1	0.6
1999 .....	2.8	0.9	0.4	0.6	0.1	0.5

NOTES: Employment at institutions without a Carnegie code or with unknown administrative control is included only in total. Free-standing schools of engineering and technology are shown with comprehensive institutions. Institutions are designated by the 1994 Carnegie classification code. See Carnegie Foundation for the Advancement of Teaching, *A Classification of Institutions of Higher Education* (Princeton, NJ, Princeton University Press, 1994). Junior faculty includes assistant professors and instructors; senior faculty includes full and associate professors. Data excludes those with foreign-earned doctorates.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients, unpublished tabulations.

Appendix table 5-26.

**Academic employment of doctoral scientists and engineers, by type of position and field of degree: 1973-99**

(Thousands)

Field of degree	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>All positions</b>														
<b>Total S&amp;E</b>	118.0	134.1	145.4	155.3	167.1	176.1	190.2	195.9	206.6	210.6	213.8	217.5	232.5	240.2
Total sciences	105.6	120.7	130.7	139.5	151.0	158.1	170.4	174.8	183.9	187.8	190.6	193.7	205.9	214.7
Physical sciences	22.1	23.6	25.0	24.6	25.4	25.1	27.0	27.2	27.7	27.7	28.6	29.3	30.2	30.9
Mathematics	9.7	11.0	11.7	12.2	12.4	12.9	13.6	13.8	14.5	15.2	15.5	14.6	15.6	15.2
Computer sciences	NA	NA	NA	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.1	3.3	3.7
Environmental sciences	3.4	3.9	4.2	4.2	4.6	4.8	5.2	5.6	5.9	6.0	6.4	6.4	7.3	7.8
Life sciences	34.9	39.4	42.6	47.0	51.3	54.9	58.7	61.3	64.8	66.9	68.2	71.6	77.3	81.9
Psychology	12.2	14.8	16.2	17.7	20.1	21.0	23.1	23.7	25.0	25.2	25.0	26.1	27.3	29.0
Social sciences	23.4	28.0	31.1	33.6	36.9	38.9	42.0	42.2	44.5	44.8	44.4	42.5	44.9	46.2
Engineering	12.4	13.4	14.8	15.8	16.1	18.1	19.9	21.2	22.9	22.8	23.1	23.8	26.6	25.5
<b>Total full-time faculty</b>														
<b>Total S&amp;E</b>	103.3	116.4	125.6	131.2	141.9	148.4	156.9	164.4	169.8	173.1	172.4	171.4	178.4	184.0
Total sciences	92.0	104.2	112.2	116.9	127.3	132.0	139.0	145.2	149.6	153.1	152.3	151.3	156.8	163.0
Physical sciences	17.8	18.9	20.0	20.0	20.5	20.2	21.2	22.0	21.5	21.7	21.3	20.9	21.4	21.7
Mathematics	9.3	10.4	10.9	11.4	11.7	12.3	12.7	12.9	13.5	14.2	14.7	13.0	13.6	13.1
Computer sciences	NA	NA	NA	0.1	0.3	0.4	0.7	0.9	1.3	1.8	2.3	2.8	3.0	3.3
Environmental sciences	3.0	3.4	3.6	3.5	3.8	4.0	4.2	4.4	4.7	4.5	4.5	4.7	5.1	5.6
Life sciences	29.5	33.1	34.9	37.3	40.9	43.5	45.6	48.1	49.3	51.1	50.8	52.8	55.2	58.1
Psychology	10.8	12.8	13.9	14.3	16.4	17.3	18.5	19.2	20.2	20.7	19.5	20.1	20.8	21.9
Social sciences	21.6	25.5	28.8	30.4	33.7	34.4	36.1	37.7	39.0	39.0	39.2	37.1	37.7	39.2
Engineering	11.3	12.2	13.5	14.3	14.7	16.4	17.9	19.3	20.2	20.1	20.1	20.0	21.5	21.1
<b>Full-time professors</b>														
<b>Total S&amp;E</b>	42.6	47.9	51.0	57.5	64.4	69.9	72.8	79.1	83.1	82.5	80.0	77.7	80.9	83.1
Total sciences	37.8	42.4	44.7	50.1	56.4	60.9	63.7	68.7	72.5	72.6	69.7	68.6	70.2	72.4
Physical sciences	7.7	8.6	9.2	10.0	11.2	11.9	12.6	13.5	13.2	12.8	12.1	11.6	11.4	11.6
Mathematics	3.2	3.5	3.9	4.4	5.0	5.6	6.1	6.5	6.9	6.7	7.1	6.6	6.9	6.6
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.7
Environmental sciences	1.3	1.4	1.6	1.7	1.9	2.0	2.0	2.0	2.3	2.0	2.1	2.3	2.4	2.6
Life sciences	12.3	13.6	13.9	15.5	17.0	19.3	19.6	21.7	22.5	22.9	21.2	22.5	22.5	23.3
Psychology	3.9	4.6	4.8	5.6	6.5	7.0	7.6	8.3	9.1	9.5	8.7	8.7	9.5	9.4
Social sciences	9.4	10.6	11.3	12.9	14.7	15.1	15.9	16.8	18.5	18.6	18.4	16.6	17.1	18.2
Engineering	4.7	5.6	6.4	7.4	8.0	9.0	9.2	10.4	10.6	9.9	10.3	9.1	10.7	10.6
<b>Full-time associate professors</b>														
<b>Total S&amp;E</b>	31.4	36.3	39.7	39.7	42.9	45.7	46.9	48.2	47.9	50.5	48.6	49.6	51.0	53.6
Total sciences	27.4	32.2	35.3	35.5	38.5	40.9	42.2	43.3	42.6	44.7	43.3	43.5	45.2	47.6
Physical sciences	5.3	6.0	6.1	6.0	5.6	5.2	5.1	4.9	4.5	4.7	4.8	4.8	5.2	5.1
Mathematics	2.8	3.4	3.7	3.9	4.0	4.1	4.0	4.1	4.0	5.1	4.4	4.0	3.9	4.1
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.4	0.8	0.7	1.4	1.4	1.4
Environmental sciences	0.9	1.1	1.1	1.1	1.0	1.1	1.2	1.2	1.3	1.6	1.6	1.3	1.3	1.5
Life sciences	8.6	9.8	10.7	11.5	12.5	13.4	14.1	14.1	14.0	14.6	14.6	14.7	15.8	17.3
Psychology	3.3	4.1	4.3	4.3	5.2	5.9	5.9	6.0	5.9	5.9	5.6	5.8	6.2	
Social sciences	6.5	7.9	9.4	8.8	10.2	11.2	11.8	12.7	12.6	12.0	11.6	11.5	11.7	11.9
Engineering	4.0	4.2	4.4	4.2	4.4	4.7	4.7	4.9	5.3	5.9	5.3	6.2	5.8	6.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-26.

**Academic employment of doctoral scientists and engineers, by type of position and field of degree: 1973–99**

(Thousands)

Field of degree	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Full-time junior faculty</b>														
<b>Total S&amp;E</b>	29.3	32.1	34.9	34.0	34.6	32.8	37.2	37.2	38.7	40.1	43.8	44.0	46.4	47.4
Total sciences	26.7	29.6	32.2	31.3	32.3	30.2	33.1	33.2	34.4	35.8	39.3	39.3	41.5	42.9
Physical sciences	4.8	4.3	4.8	4.0	3.7	3.1	3.5	3.6	3.7	4.1	4.3	4.5	4.8	5.1
Mathematics	3.3	3.5	3.3	3.1	2.6	2.5	2.7	2.4	2.6	2.4	3.2	2.4	2.8	2.4
Computer sciences	NA	NA	NA	0.1	0.2	0.3	0.6	0.6	0.9	1.0	1.4	1.2	1.3	1.2
Environmental sciences	0.8	0.9	0.9	0.7	0.9	0.9	1.1	1.1	1.1	0.9	0.9	1.1	1.3	1.5
Life sciences	8.5	9.7	10.3	10.3	11.3	10.8	11.9	12.3	12.8	13.7	15.0	15.6	16.9	17.5
Psychology	3.6	4.2	4.8	4.4	4.8	4.5	5.0	4.9	5.2	5.4	5.2	5.5	5.5	6.2
Social sciences	5.7	7.1	8.2	8.6	8.8	8.1	8.4	8.2	7.9	8.4	9.3	9.0	8.9	9.1
Engineering	2.6	2.5	2.7	2.8	2.3	2.7	4.0	4.0	4.3	4.3	4.5	4.8	5.0	4.5
<b>All other full-time positions</b>														
<b>Total S&amp;E</b>	7.6	8.3	8.8	11.4	12.6	13.4	18.1	16.4	19.2	20.2	22.2	23.9	26.4	29.3
Total sciences	6.8	7.4	8.0	10.5	11.5	12.3	16.6	15.3	17.7	18.4	20.7	21.7	23.3	26.4
Physical sciences	1.9	1.9	2.1	2.0	2.4	2.5	3.0	2.6	3.3	3.2	3.7	3.8	4.6	5.6
Mathematics	0.2	0.3	0.4	0.4	0.4	0.3	0.5	0.4	0.5	0.6	0.5	0.6	0.8	0.8
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3
Environmental sciences	0.3	0.3	0.3	0.5	0.5	0.5	0.7	0.8	0.7	0.9	1.1	1.1	1.4	1.4
Life sciences	2.5	2.4	2.8	3.9	4.0	4.6	6.2	6.0	6.7	7.2	7.7	8.4	8.4	9.5
Psychology	0.8	1.0	1.2	1.8	2.2	2.2	2.9	2.8	2.9	2.8	3.9	3.9	4	4.6
Social sciences	1.0	1.5	1.2	1.9	2.0	2.2	3.2	2.6	3.5	3.5	3.7	3.6	3.9	4.3
Engineering	0.8	0.9	0.8	0.9	1.1	1.1	1.5	1.1	1.5	1.8	1.5	2.1	3.1	3.0
<b>Postdoctoral positions</b>														
<b>Total S&amp;E</b>	4.2	6.2	7.6	8.1	8.5	8.3	8.7	9.3	11.5	9.9	13.3	16.8	18.9	18.5
Total sciences	4.0	5.9	7.2	7.8	8.4	8.0	8.5	8.8	10.9	9.4	12.3	15.6	17.2	17.5
Physical sciences	1.7	2.1	2.2	1.9	1.9	1.4	1.9	2.0	2.4	1.9	3.0	3.9	3.2	2.9
Mathematics	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.1	0.0	0.5	0.5	0.6
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Environmental sciences	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.5	0.6	0.5
Life sciences	1.9	3.0	4.0	4.7	5.2	5.1	5.2	5.6	6.8	6.4	8.2	9.2	10.8	11.7
Psychology	0.2	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.5	0.4	1.1	1.3	1.2
Social sciences	0.1	0.2	0.3	0.3	0.3	0.6	0.3	0.1	0.4	0.3	0.2	0.4	0.7	0.5
Engineering	0.2	0.3	0.4	0.3	0.2	0.3	0.2	0.5	0.6	0.5	1.0	1.2	1.7	1.1
<b>Part-time positions</b>														
<b>Total S&amp;E</b>	2.9	3.2	3.4	4.5	4.0	6.0	6.5	5.7	6.2	7.4	5.9	5.5	8.9	8.2
Total sciences	2.8	3.1	3.2	4.3	3.9	5.7	6.2	5.4	5.6	6.9	5.4	5.1	8.6	7.9
Physical sciences	0.6	0.6	0.6	0.7	0.6	1.0	0.9	0.6	0.5	0.9	0.7	0.7	1.0	0.7
Mathematics	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.7	0.7
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Environmental sciences	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3
Life sciences	0.9	0.9	1.0	1.2	1.2	1.7	1.7	1.6	1.9	2.3	1.6	1.2	2.9	2.6
Psychology	0.4	0.5	0.6	1.0	0.8	1.0	1.0	1.0	1.0	1.2	1.2	1.1	1.1	1.3
Social sciences	0.7	0.8	0.8	1.0	1.0	1.6	2.2	1.8	1.7	2.0	1.3	1.3	2.6	2.2
Engineering	0.1	0.1	0.1	0.3	0.2	0.4	0.3	0.3	0.5	0.5	0.5	0.4	0.3	0.4

NA = not available

NOTES: Data exclude scientists and engineers with doctorates from foreign institutions. Faculty is defined by position: senior faculty includes full and associate professors; junior faculty members are assistant professors or instructors. Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Division of Science Resources Studies (NSF/SRS), *Characteristics of Doctoral Scientists and Engineers in the United States: 1999, Detailed Statistics Tables* (forthcoming).

See figure 5-20 in Volume 1.

Appendix table 5-27.

**Recent S&E Ph.D.s employed in academia by years since doctorate, type institution, appointment, and tenure status: 1973-99**  
 (Percent)

Year	Total	Type of appointment			Tenure status				
		Full-time faculty	Post-doctorates	Other positions	Total	Tenured	Untenured	Not on tenure track	
<b>One to three years since doctorate</b>									
<b>Universities and colleges, total</b>									
1973 .....	100.0	73.6	12.8	13.6	NA	NA	NA	NA	
1975 .....	100.0	70.1	18.4	11.1	NA	NA	NA	NA	
1977 .....	100.0	64.9	23.1	12.4	NA	NA	NA	NA	
1979 .....	100.0	59.3	24.9	15.8	45.1	7.4	37.7	54.9	
1981 .....	100.0	57.0	28.5	14.5	45.0	5.2	39.8	55.0	
1983 .....	100.0	56.6	27.8	15.6	66.2	8.4	57.8	33.8	
1985 .....	100.0	54.6	27.5	17.9	49.0	4.2	44.8	51.0	
1987 .....	100.0	51.7	29.9	18.5	48.6	3.8	44.8	51.4	
1989 .....	100.0	47.6	33.5	18.9	44.1	3.7	40.4	55.9	
1991 .....	100.0	54.9	27.5	17.6	65.2	4.6	60.6	34.8	
1993 .....	100.0	47.8	33.5	19.1	36.3	1.9	34.4	63.7	
1995 .....	100.0	41.3	39.8	19.0	31.2	2.6	28.6	68.8	
1997 .....	100.0	40.7	41.4	17.9	32.0	2.6	29.5	68.0	
1999 .....	100.0	37.3	43.1	19.6	28.8	2.0	26.8	71.2	
<b>Research universities</b>									
1973 .....	100.0	60.3	21.4	17.5	NA	NA	NA	NA	
1975 .....	100.0	56.3	28.6	14.3	NA	NA	NA	NA	
1977 .....	100.0	50.4	35.8	13.8	NA	NA	NA	NA	
1979 .....	100.0	48.0	35.8	16.3	34.8	1.6	33.2	65.2	
1981 .....	100.0	45.7	38.8	15.5	36.3	1.1	35.2	63.7	
1983 .....	100.0	43.0	40.5	16.5	56.9	2.6	54.3	43.1	
1985 .....	100.0	43.8	37.2	19.0	39.6	0.6	39.1	60.4	
1987 .....	100.0	40.4	40.4	19.9	39.2	1.3	37.9	60.8	
1989 .....	100.0	36.7	44.0	19.3	36.0	1.2	34.8	64.0	
1991 .....	100.0	41.8	38.6	19.6	57.3	2.4	55.0	42.7	
1993 .....	100.0	33.1	46.1	20.1	23.7	0.7	23.0	76.3	
1995 .....	100.0	26.7	54.7	18.6	19.6	0.4	19.2	80.4	
1997 .....	100.0	26.7	56.5	16.8	19.5	0.6	18.9	80.5	
1999 .....	100.0	24.1	58.2	17.7	18.9	0.7	18.2	81.1	
<b>Other types of academic institutions</b>									
1973 .....	100.0	90.7	2.8	6.5	NA	NA	NA	NA	
1975 .....	100.0	87.5	5.2	6.3	NA	NA	NA	NA	
1977 .....	100.0	83.9	8.0	8.0	NA	NA	NA	NA	
1979 .....	100.0	77.0	9.5	13.5	59.5	15.6	43.9	40.5	
1981 .....	100.0	77.9	11.8	10.3	59.4	12.1	47.4	40.6	
1983 .....	100.0	80.3	9.1	10.6	76.9	15.1	61.8	23.1	
1985 .....	100.0	74.6	11.3	14.1	63.5	9.9	53.6	36.5	
1987 .....	100.0	73.1	10.4	16.4	64.4	8.1	56.4	35.6	
1989 .....	100.0	68.8	14.3	16.9	56.9	7.5	49.4	43.1	
1991 .....	100.0	76.1	10.9	13.0	73.0	6.7	66.2	27.0	
1993 .....	100.0	71.3	12.6	16.1	56.1	3.8	52.3	43.9	
1995 .....	100.0	66.7	17.2	17.2	48.6	5.9	42.7	51.4	
1997 .....	100.0	66.7	17.7	15.6	47.6	4.9	42.6	52.4	
1999 .....	100.0	64.0	19.8	16.3	42.1	3.7	38.4	57.9	

See explanatory notes, if any, and source at end of table.

Appendix table 5-27.

**Recent S&E Ph.D.s employed in academia by years since doctorate, type institution, appointment, and tenure status: 1973-99**  
 (Percent)

Year	Total	Type of appointment			Tenure status			
		Full-time faculty	Post-doctorates	Other positions	Total	Tenured	Untenured	
<b>Four to seven years since doctorate</b>								
<b>Universities and colleges, total</b>								
1973 .....	100.0	89.2	2.4	8.4	NA	NA	NA	
1975 .....	100.0	87.1	4.3	8.3	NA	NA	NA	
1977 .....	100.0	85.0	5.3	9.7	NA	NA	NA	
1979 .....	100.0	81.2	6.1	12.9	65.7	26.3	39.4	
1981 .....	100.0	80.8	6.3	13.2	70.3	24.9	45.3	
1983 .....	100.0	76.8	5.7	17.2	65.7	23.8	42.0	
1985 .....	100.0	76.9	6.9	16.4	65.2	19.4	45.8	
1987 .....	100.0	75.0	7.6	17.2	60.4	16.6	43.8	
1989 .....	100.0	73.2	9.1	17.8	59.5	12.6	46.9	
1991 .....	100.0	75.0	7.1	17.6	65.1	21.2	43.9	
1993 .....	100.0	72.1	11.1	16.7	60.4	12.4	48.0	
1995 .....	100.0	70.3	12.9	16.8	59.3	12.4	46.9	
1997 .....	100.0	66.3	14.8	19.0	54.1	11.6	42.5	
1999 .....	100.0	65.4	14.1	20.5	52.4	10.4	42.0	
<b>Research universities</b>								
1973 .....	100.0	86.8	4.0	9.7	NA	NA	NA	
1975 .....	100.0	82.1	7.7	9.8	NA	NA	NA	
1977 .....	100.0	77.8	9.4	13.3	NA	NA	NA	
1979 .....	100.0	74.0	9.8	16.7	60.0	20.2	39.8	
1981 .....	100.0	74.4	8.9	16.8	61.6	16.2	45.4	
1983 .....	100.0	70.5	8.7	21.2	60.2	14.4	45.8	
1985 .....	100.0	69.1	10.9	20.0	58.7	11.9	46.8	
1987 .....	100.0	67.0	11.4	21.9	53.1	12.2	40.9	
1989 .....	100.0	65.1	13.7	20.9	52.3	7.5	44.8	
1991 .....	100.0	65.9	11.6	22.8	56.9	16.2	40.7	
1993 .....	100.0	64.5	17.5	18.6	52.4	6.9	45.5	
1995 .....	100.0	59.9	19.8	19.9	49.0	7.6	41.3	
1997 .....	100.0	55.2	21.3	23.1	43.5	5.9	37.7	
1999 .....	100.0	54.8	21.0	24.3	41.8	5.8	36.0	
<b>Other types of academic institutions</b>								
1973 .....	100.0	91.8	0.7	7.1	NA	NA	NA	
1975 .....	100.0	91.8	1.1	6.8	NA	NA	NA	
1977 .....	100.0	92.1	1.6	6.5	NA	NA	NA	
1979 .....	100.0	89.2	1.9	8.7	71.9	32.9	39.0	
1981 .....	100.0	87.9	3.4	9.3	80.1	34.8	45.3	
1983 .....	100.0	84.4	2.7	13.4	71.3	33.3	38.1	
1985 .....	100.0	86.2	2.2	12.1	73.0	28.5	44.5	
1987 .....	100.0	87.4	2.4	10.9	70.4	22.6	47.7	
1989 .....	100.0	84.6	2.4	13.3	69.7	19.9	49.8	
1991 .....	100.0	86.3	2.2	11.2	75.2	27.4	47.9	
1993 .....	100.0	82.6	3.4	14.6	70.2	19.1	51.1	
1995 .....	100.0	81.6	5.1	13.2	71.2	17.9	53.3	
1997 .....	100.0	77.5	7.7	14.9	64.6	17.3	47.3	
1999 .....	100.0	75.3	7.6	16.9	62.3	14.7	47.7	

NA=not available

NOTES: Recent Ph.D.s are defined as having earned their doctorate within three years or within four to seven years, respectively, preceding the survey year. Full-time faculty includes full, associate, and assistant professors plus instructors. Other types of positions include full-time non-faculty appointments such as postdocs, research associates, adjunct appointments, lecturers, administrative positions, and part-time appointments of all kinds. Details may not add to totals because of rounding and omission of respondents with unreported work responsibility or unknown tenure status. Foreign doctorates are excluded. Institutions are designated by the 1994 Carnegie classification code. (See Carnegie Foundation for the Advancement of Teaching, *A Classification of Institutions of Higher Education*, 1994 ed., Princeton: Princeton University Press, 1994).

SOURCE: National Science Foundation, Survey of Doctorate Recipients.

Appendix table 5-28.

**Age distribution of academic doctoral scientists and engineers, by type of appointment: 1973–99**

(Mean, median, and percent by age group)

Year	Age (years)		Total	Distribution (percent)				
	Mean	Median		Less than 35	35–44	45–54	55–64	65 and more
<b>All doctoral scientists and engineers</b>								
1973 .....	42.0	39.6	100.0	28.3	35.2	23.3	10.9	2.2
1975 .....	42.4	39.9	100.0	25.9	36.8	23.7	11.7	2.0
1977 .....	42.7	40.0	100.0	22.9	38.9	23.8	12.4	2.0
1979 .....	43.3	40.7	100.0	20.1	40.3	23.8	13.6	2.2
1981 .....	44.0	41.5	100.0	18.3	40.5	23.7	14.5	2.9
1983 .....	44.8	42.5	100.0	14.9	40.8	25.2	15.7	3.4
1985 .....	45.2	43.2	100.0	14.2	39.2	26.8	15.9	3.8
1987 .....	45.6	44.2	100.0	12.9	36.5	30.6	16.5	3.5
1989 .....	46.1	45.0	100.0	12.1	34.7	32.2	16.9	4.1
1991 .....	46.3	45.3	100.0	11.5	33.7	34.2	16.9	3.8
1993 .....	45.8	45.0	100.0	13.3	33.3	34.4	16.1	3.0
1995 .....	46.2	45.3	100.0	12.7	32.9	33.6	17.4	3.5
1997 .....	46.6	45.8	100.0	13.3	30.7	32.8	19.6	3.6
1999 .....	45.0	44.7	100.0	18.2	30.8	31.5	17.2	2.3
<b>Full-time faculty</b>								
1973 .....	42.4	40.3	100.0	25.6	36.6	24.6	11.3	2.0
1975 .....	42.8	40.6	100.0	22.9	38.2	25.1	12.0	1.8
1977 .....	43.3	40.9	100.0	19.2	40.1	25.7	13.3	1.7
1979 .....	44.0	41.6	100.0	16.2	41.1	25.9	14.7	2.0
1981 .....	44.7	42.4	100.0	14.7	41.2	25.8	15.7	2.7
1983 .....	45.5	43.4	100.0	11.3	41.2	27.5	17.2	2.8
1985 .....	45.8	43.9	100.0	10.8	39.6	29.0	17.0	3.5
1987 .....	46.6	45.1	100.0	9.2	35.9	33.2	18.1	3.5
1989 .....	47.1	46.0	100.0	8.3	33.8	35.4	18.8	3.8
1991 .....	47.0	46.4	100.0	8.8	32.7	36.8	18.3	3.4
1993 .....	46.9	46.0	100.0	9.3	32.4	36.9	18.0	3.3
1995 .....	47.5	46.9	100.0	8.0	31.9	36.6	19.8	3.8
1997 .....	48.0	47.5	100.0	8.2	29.9	35.6	22.2	4.0
1999 .....	46.5	46.0	100.0	12.2	31.1	34.2	19.8	2.6
<b>Postdoctorates</b>								
1973 .....	32.1	30.3	100.0	81.2	15.2	3.0	0.6	0.0
1975 .....	32.7	31.2	100.0	78.0	18.7	2.0	1.1	0.2
1977 .....	32.9	31.1	100.0	75.3	21.7	2.4	0.6	0.0
1979 .....	33.1	31.6	100.0	71.7	25.5	2.1	0.7	0.0
1981 .....	33.1	31.6	100.0	71.9	24.6	2.6	0.6	0.3
1983 .....	33.7	31.7	100.0	68.4	27.0	3.5	1.0	0.2
1985 .....	33.3	31.9	100.0	70.6	27.2	2.1	0.1	0.0
1987 .....	33.8	32.0	100.0	68.4	28.3	2.4	0.5	0.4
1989 .....	34.6	32.6	100.0	63.9	29.9	4.5	1.0	0.7
1991 .....	34.7	33.1	100.0	57.2	39.0	2.8	1.0	0.0
1993 .....	33.9	32.7	100.0	62.3	34.7	2.5	0.5	0.0
1995 .....	35.0	33.0	100.0	56.6	35.9	5.8	1.6	0.1
1997 .....	35.0	33.0	100.0	60.7	32.3	4.6	2.1	0.3
1999 .....	32.5	31.0	100.0	74.6	22.0	3.1	0.3	0.0
<b>Other appointments</b>								
1973 .....	41.9	38.2	100.0	34.6	30.3	18.7	10.9	5.4
1975 .....	43.3	40.0	100.0	27.5	32.0	21.8	13.4	5.4
1977 .....	42.5	38.3	100.0	28.4	37.4	17.5	10.6	6.1
1979 .....	42.5	38.6	100.0	25.2	41.6	17.0	10.9	5.2
1981 .....	43.3	39.6	100.0	21.8	43.6	17.0	11.1	6.4
1983 .....	44.1	39.9	100.0	19.3	43.6	17.5	10.6	8.9
1985 .....	45.3	42.5	100.0	15.9	41.0	21.6	14.7	6.8
1987 .....	43.9	41.1	100.0	16.9	43.9	23.3	10.9	5.0
1989 .....	44.9	42.2	100.0	14.2	43.3	23.5	11.2	7.8
1991 .....	46.1	44.0	100.0	11.6	38.2	28.7	14.2	7.3
1993 .....	44.6	43.2	100.0	14.2	37.9	33.9	11.3	2.7
1995 .....	44.8	43.5	100.0	15.0	37.0	31.7	12.4	3.8
1997 .....	45.8	44.7	100.0	13.4	33.9	33.5	15.7	3.4
1999 .....	44.0	43.0	100.0	19.4	33.7	32.0	12.9	2.0

NOTES: Faculty positions include full, associate, and assistant professors and instructors. Foreign-earned doctorates are excluded. Details may not add to total because of rounding.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients, unpublished tabulations.

See figure 5-23 in Volume 1.

Science & Engineering Indicators – 2002

Appendix table 5-29.

**Age distribution of doctoral scientists and engineers in full-time faculty positions at research universities and other academic institutions: 1973–99  
(Percentages)**

Age (years)	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>All universities and colleges</b>														
<b>Total number (in thousands) .....</b>	103.3	116.4	125.6	131.2	141.9	148.4	156.9	164.4	169.8	173.1	172.4	171.4	178.4	184.0
Less than 30 .....	3.6	2.9	2.3	1.7	1.5	1.1	1.0	0.7	0.5	0.8	1.1	0.7	0.8	2.6
30–34 .....	22.0	20.1	16.9	14.5	13.2	10.2	9.9	8.5	7.8	8.1	8.3	7.3	7.5	9.7
35–39 .....	19.9	21.6	23.7	23.3	20.7	18.6	18.2	15.9	15.1	14.9	15.3	14.9	13.1	14.4
40–44 .....	16.6	16.6	16.4	17.8	20.5	22.6	21.4	20.0	18.6	17.8	17.1	17.0	16.7	16.7
45–49 .....	13.6	13.8	14.3	14.1	13.8	15.1	17.0	20.1	20.8	19.4	18.4	17.9	17.2	16.8
50–54 .....	11.0	11.3	11.4	11.8	12.0	12.4	12.0	13.1	14.6	17.4	18.5	18.7	18.5	17.5
55–59 .....	7.0	7.5	8.4	9.3	9.4	10.3	9.7	10.5	11.1	11.0	10.6	12.4	14.5	13.6
60–64 .....	4.3	4.6	4.8	5.4	6.3	7.0	7.3	7.6	7.7	7.2	7.5	7.4	7.7	6.2
65 or more .....	2.0	1.8	1.7	2.0	2.7	2.8	3.5	3.5	3.8	3.4	3.3	3.8	4.0	2.6
<b>Research universities<sup>a</sup></b>														
<b>Total number (in thousands) .....</b>	55.7	61.5	64.7	67.1	73.8	72.2	80.6	84.2	86.6	85.8	84.4	81.6	81.5	84.2
Less than 30 .....	3.4	3.0	2.5	2.2	2.1	1.4	1.2	1.0	0.6	0.8	1.2	0.9	0.9	2.4
30–34 .....	20.6	18.8	16.4	14.9	14.1	11.2	11.4	9.8	9.3	9.1	9.4	7.3	7.0	9.6
35–39 .....	19.3	20.3	21.0	21.7	19.8	18.0	17.9	16.6	17.1	16.6	16.6	16.4	14.0	15.0
40–44 .....	16.4	16.3	16.2	17.2	18.8	20.2	20.0	18.7	17.2	17.5	17.6	18.4	17.6	17.7
45–49 .....	14.3	14.2	14.7	13.9	12.6	14.9	15.4	17.8	18.4	17.8	16.9	16.9	17.3	15.8
50–54 .....	11.4	12.2	12.3	12.1	12.1	12.1	12.0	12.9	13.8	15.6	16.0	16.5	17.3	16.8
55–59 .....	7.7	8.3	9.3	10.0	10.4	10.8	9.8	10.3	10.9	10.7	11.0	11.8	13.5	12.8
60–64 .....	4.8	5.0	5.4	5.8	6.8	8.0	8.2	8.5	8.0	7.7	7.8	7.5	7.8	6.5
65 or more .....	2.1	1.9	2.2	2.3	3.2	3.5	4.1	4.3	4.8	4.2	3.7	4.2	4.7	3.2
<b>Other types of universities and colleges</b>														
<b>Total number (in thousands) .....</b>	47.6	54.9	61.0	64.1	68.2	76.2	76.2	80.2	83.2	87.3	88.1	89.7	96.8	99.9
Less than 30 .....	3.8	2.8	2.1	1.2	0.9	0.8	0.8	0.4	0.4	0.8	0.9	0.6	0.7	2.7
30–34 .....	23.6	21.4	17.5	14.1	12.2	9.4	8.2	7.1	6.3	7.1	7.3	7.2	7.9	9.7
35–39 .....	20.7	23.0	26.5	25.1	21.6	19.1	18.5	15.2	13.1	13.1	14.1	13.5	12.5	13.9
40–44 .....	16.8	17.0	16.6	18.4	22.3	24.9	22.8	21.3	20.1	18.1	16.7	15.7	16.0	15.9
45–49 .....	12.8	13.3	13.9	14.3	15.0	15.2	18.8	22.5	23.4	20.9	19.9	18.8	17.1	17.5
50–54 .....	10.5	10.3	10.4	11.6	11.8	12.7	12.0	13.4	15.4	19.2	20.8	20.6	19.5	18.0
55–59 .....	6.3	6.5	7.5	8.5	8.4	9.8	9.6	10.8	11.2	11.3	10.2	12.9	15.4	14.2
60–64 .....	3.6	4.2	4.2	5.1	5.8	5.9	6.3	6.6	7.4	6.8	7.1	7.2	7.5	6.0
65 or more .....	1.8	1.6	1.2	1.7	2.0	2.2	2.9	2.6	2.7	2.7	3.0	3.3	3.5	2.2

<sup>a</sup>Research universities are designated by Carnegie classification code (see Carnegie Foundation for the Advancement of Teaching, *A Classification of Institutions of Higher Education*, Princeton, NJ: Princeton University Press, 1994).

NOTE: Faculty positions include full, associate, and assistant professors and instructors. Foreign-earned doctorates are excluded.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients, unpublished tabulations (Arlington, VA, 1999).

See figure 5-23 in Volume 1.

Science & Engineering Indicators – 2002

Appendix table 5-30.

**Doctoral scientists and engineers employed in academia, by degree field, sex, and type of position: 1973–99**  
 (Thousands)

Field of degree and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Total academic employment</b>														
<b>All, total S&amp;E</b>	118.0	134.1	145.5	155.3	167.1	176.1	190.2	195.9	206.6	210.6	213.8	217.5	232.5	240.2
Total sciences	105.6	120.7	130.7	139.5	151.0	158.1	170.4	174.8	183.9	187.8	190.6	193.7	205.9	214.7
Physical sciences	22.1	23.6	25.0	24.6	25.4	25.1	27.0	27.2	27.7	27.7	28.6	29.3	30.2	30.9
Mathematics	9.7	11.0	11.7	12.2	12.4	12.9	13.6	13.8	14.5	15.2	15.5	14.6	15.6	15.2
Computer sciences	NA	NA	NA	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.1	3.3	3.7
Environmental sciences	3.4	3.9	4.2	4.2	4.6	4.8	5.2	5.6	5.9	6.0	6.4	6.4	7.3	7.8
Life sciences	34.9	39.4	42.6	47.0	51.3	54.9	58.7	61.3	64.8	66.9	68.2	71.6	77.3	81.9
Psychology	12.2	14.8	16.2	17.7	20.1	21.0	23.1	23.7	25.0	25.2	25.0	26.1	27.3	29.0
Social sciences	23.4	28.0	31.1	33.6	36.9	38.9	42.0	42.2	44.5	44.8	44.4	42.5	44.9	46.2
Engineering	12.4	13.4	14.8	15.8	16.1	18.1	19.9	21.2	22.9	22.8	23.1	23.8	26.6	25.5
<b>Male, total S&amp;E</b>	107.3	120.3	129.0	136.0	144.0	149.8	159.2	162.0	168.0	168.7	166.9	165.1	173.3	175.8
Total sciences	94.9	106.9	114.3	120.3	128.1	132.0	139.7	141.4	145.8	146.9	144.8	142.9	148.4	152.4
Physical sciences	20.7	22.1	23.3	22.9	23.5	23.2	24.9	24.9	25.2	25.4	25.7	25.9	26.2	27.0
Mathematics	9.0	10.3	10.8	11.3	11.3	11.8	12.3	12.5	13.0	13.9	13.7	12.8	13.5	12.9
Computer sciences	NA	NA	NA	0.1	0.3	0.4	0.7	0.9	1.3	1.6	2.1	2.5	2.6	2.9
Environmental sciences	3.3	3.8	4.1	4.0	4.3	4.5	4.9	5.1	5.3	5.4	5.7	5.5	6.2	6.4
Life sciences	30.8	34.3	36.6	40.1	42.9	44.5	46.7	47.9	49.5	50.1	49.4	50.1	52.6	55.1
Psychology	10.0	11.8	12.6	13.5	14.9	15.1	16.0	16.2	16.5	16.0	14.7	14.7	15.4	15.6
Social sciences	21.0	24.7	26.9	28.5	30.9	32.3	34.3	33.9	35.1	34.6	33.4	31.3	31.9	32.4
Engineering	12.3	13.3	14.7	15.7	15.9	17.8	19.5	20.6	22.2	21.8	22.1	22.3	24.8	23.4
<b>Female, total S&amp;E</b>	10.7	13.8	16.5	19.4	23.1	26.5	31.1	34.0	38.7	41.9	46.9	52.4	59.2	64.4
Total sciences	10.7	13.8	16.4	19.2	22.9	26.1	30.7	33.5	38.0	40.9	45.8	50.9	57.5	62.3
Physical sciences	1.4	1.5	1.6	1.7	1.9	1.9	2.1	2.3	2.5	2.3	2.9	3.5	4.0	3.9
Mathematics	0.6	0.8	0.9	0.9	1.1	1.1	1.3	1.4	1.5	1.4	1.7	1.8	2.1	2.2
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.2	0.4	0.5	0.6	0.7	0.8	
Environmental sciences	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.9	1.1	1.4
Life sciences	4.0	5.1	6.0	6.9	8.4	10.3	12.1	13.3	15.3	16.8	18.8	21.5	24.7	26.7
Psychology	2.2	3.0	3.6	4.3	5.2	5.9	7.1	7.6	8.5	9.2	10.3	11.5	11.9	13.4
Social sciences	2.4	3.3	4.2	5.2	6.0	6.5	7.7	8.3	9.4	10.2	10.9	11.2	13.0	13.8
Engineering	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.6	0.7	1.0	1.1	1.5	1.7	2.1
<b>Full-time senior faculty</b>														
<b>All, total S&amp;E</b>	74.0	84.3	90.7	97.2	107.3	115.6	119.7	127.3	131.0	133.0	128.6	127.3	131.9	136.7
Total sciences	65.3	74.5	80.0	85.6	94.9	101.8	105.8	112.0	115.2	117.2	113.0	112.1	115.4	120.1
Physical sciences	13.0	14.6	15.3	16.0	16.8	17.1	17.7	18.3	17.8	17.6	16.9	16.4	16.7	16.6
Mathematics	5.9	6.9	7.6	8.3	9.1	9.7	10.0	10.5	10.9	11.8	11.5	10.6	10.8	
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.3	0.4	0.9	0.9	1.7	1.7	2.1
Environmental sciences	2.2	2.5	2.7	2.8	2.9	3.1	3.1	3.2	3.6	3.6	3.7	3.6	3.8	4.1
Life sciences	21.0	23.4	24.6	27.0	29.6	32.6	33.7	35.8	36.4	37.4	35.8	37.2	38.3	40.6
Psychology	7.3	8.7	9.1	9.9	11.7	12.8	13.5	14.3	15.0	15.3	14.3	14.5	15.3	15.6
Social sciences	15.9	18.5	20.7	21.7	24.9	26.3	27.7	29.5	31.1	30.6	29.9	28.1	28.8	30.1
Engineering	8.7	9.7	10.7	11.6	12.4	13.7	13.9	15.3	15.9	15.8	15.7	15.3	16.6	16.6
<b>Male, total S&amp;E</b>	69.7	78.9	84.7	90.2	98.7	104.9	107.4	113.2	115.2	115.5	110.3	107.0	109.4	110.6
Total sciences	61.0	69.2	74.0	78.7	86.4	91.3	93.7	98.2	99.6	100.1	95.0	92.2	93.3	94.8
Physical sciences	12.5	14.1	14.7	15.4	16.2	16.4	17.0	17.5	16.9	16.9	16.0	15.4	15.6	15.4
Mathematics	5.6	6.5	7.2	7.9	8.6	9.1	9.3	9.8	10.0	10.8	10.5	9.8	10.0	9.7
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.3	0.4	0.8	0.8	1.4	1.3	1.6
Environmental sciences	2.2	2.5	2.7	2.7	2.8	3.0	3.0	3.1	3.4	3.4	3.5	3.4	3.3	3.6
Life sciences	19.5	21.6	22.7	24.8	26.9	29.1	29.4	31.0	31.0	31.4	29.3	29.3	30.0	31.1
Psychology	6.4	7.6	7.8	8.4	9.7	10.5	10.8	11.2	11.5	11.3	10.2	10.1	10.7	10.3

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-30.

**Doctoral scientists and engineers employed in academia, by degree field, sex, and type of position: 1973–99**  
(Thousands)

Field of degree and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
Social sciences .....	14.7	16.9	18.8	19.5	22.3	23.2	24.1	25.3	26.4	25.5	24.7	22.8	22.4	23.2
Engineering .....	8.7	9.7	10.7	11.5	12.2	13.6	13.7	15.1	15.7	15.4	15.3	14.8	16.1	15.8
<b>Female, total S&amp;E</b> .....	4.3	5.4	6.0	7.0	8.6	10.7	12.4	14.0	15.8	17.6	18.3	20.3	22.5	26.1
Total sciences .....	4.3	5.4	6.0	6.9	8.5	10.5	12.2	13.8	15.6	17.1	18.0	19.8	22.0	25.3
Physical sciences .....	0.5	0.5	0.6	0.6	0.6	0.7	0.8	0.9	0.9	0.7	0.9	1.0	1.1	1.3
Mathematics .....	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	0.8	0.8	1.1
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.5
Environmental sciences .....	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.6
Life sciences .....	1.5	1.8	1.9	2.2	2.7	3.5	4.3	4.8	5.4	6.1	6.5	7.8	8.3	9.5
Psychology .....	0.8	1.1	1.2	1.4	2.0	2.4	2.7	3.1	3.5	4.0	4.1	4.4	4.6	5.4
Social sciences .....	1.1	1.5	1.8	2.2	2.6	3.1	3.6	4.1	4.7	5.1	5.2	5.3	6.4	7.0
Engineering .....	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.3	0.5	0.5	0.8
<b>Full-time junior faculty</b>														
<b>All, total S&amp;E</b> .....	29.3	32.1	34.9	34.0	34.6	32.8	37.2	37.2	38.7	40.1	43.8	44.0	46.4	47.4
Total sciences .....	26.7	29.6	32.2	31.3	32.3	30.2	33.1	33.2	34.4	35.8	39.3	39.3	41.5	42.9
Physical sciences .....	4.8	4.3	4.8	4.0	3.7	3.1	3.5	3.6	3.7	4.1	4.3	4.5	4.8	5.1
Mathematics .....	3.3	3.5	3.3	3.1	2.6	2.5	2.7	2.4	2.6	2.4	3.2	2.4	2.8	2.4
Computer sciences .....	NA	NA	NA	0.1	0.2	0.3	0.6	0.6	0.9	1.0	1.4	1.2	1.3	1.2
Environmental sciences .....	0.8	0.9	0.9	0.7	0.9	0.9	1.1	1.1	1.1	0.9	0.9	1.1	1.3	1.5
Life sciences .....	8.5	9.7	10.3	10.3	11.3	10.8	11.9	12.3	12.8	13.7	15.0	15.6	16.9	17.5
Psychology .....	3.6	4.2	4.8	4.4	4.8	4.5	5.0	4.9	5.2	5.4	5.2	5.5	5.5	6.2
Social sciences .....	5.7	7.1	8.2	8.6	8.8	8.1	8.4	8.2	7.9	8.4	9.3	9.0	8.9	9.1
Engineering .....	2.6	2.5	2.7	2.8	2.3	2.7	4.0	4.0	4.3	4.3	4.5	4.8	5.0	4.5
<b>Male, total S&amp;E</b> .....	26.0	27.5	28.9	27.3	27.1	25.2	27.8	27.2	27.6	28.1	29.7	28.5	29.5	30.1
Total sciences .....	23.5	25.1	26.3	24.6	24.9	22.6	23.9	23.4	23.5	24.2	25.7	24.4	25.1	26.2
Physical sciences .....	4.5	4.0	4.4	3.6	3.2	2.7	3.0	3.2	3.2	3.4	3.5	3.4	3.5	4.0
Mathematics .....	3.1	3.2	2.9	2.7	2.2	2.2	2.3	2.0	2.2	2.2	2.7	2.0	2.2	1.7
Computer sciences .....	NA	NA	NA	0.1	0.2	0.3	0.5	0.5	0.8	0.8	1.1	1.0	1.0	0.9
Environmental sciences .....	0.7	0.9	0.8	0.7	0.9	0.8	0.9	0.9	0.9	0.7	0.7	0.7	1.0	1.1
Life sciences .....	7.5	8.1	8.4	8.1	8.9	8.1	8.5	8.5	8.4	8.8	9.5	9.5	9.8	10.4
Psychology .....	2.7	3.0	3.3	2.8	3.0	2.6	2.7	2.7	2.9	3.0	2.3	2.4	2.1	2.7
Social sciences .....	5.0	5.9	6.5	6.6	6.5	5.9	6.0	5.6	5.2	5.3	5.9	5.5	5.5	5.4
Engineering .....	2.6	2.4	2.7	2.7	2.2	2.6	3.8	3.8	4.0	3.9	4.0	4.1	4.4	3.9
<b>Female, total S&amp;E</b> .....	3.3	4.6	6.0	6.8	7.5	7.7	9.4	10.0	11.2	12.0	14.1	15.6	17.0	17.3
Total sciences .....	3.3	4.6	5.9	6.7	7.4	7.6	9.2	9.7	10.8	11.6	13.6	14.9	16.4	16.7
Physical sciences .....	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.7	0.9	1.1	1.3	1.1
Mathematics .....	0.2	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.5	0.5	0.6	0.7
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.2	0.3	0.2
Environmental sciences .....	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.4
Life sciences .....	1.1	1.6	1.9	2.2	2.4	2.7	3.4	3.8	4.5	4.9	5.5	6.1	7.1	7.1
Psychology .....	0.9	1.2	1.5	1.6	1.8	1.9	2.3	2.2	2.3	2.4	2.9	3.1	3.4	3.5
Social sciences .....	0.8	1.2	1.7	2.1	2.3	2.1	2.4	2.6	2.7	3.0	3.4	3.5	3.5	3.7
Engineering .....	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.7	0.6	0.5	0.5
<b>All other full-time positions</b>														
<b>All, total S&amp;E</b> .....	7.6	8.3	8.8	11.4	12.6	13.4	18.1	16.4	19.2	20.2	22.2	23.9	26.4	29.3
Total sciences .....	6.7	7.4	8.0	10.5	11.5	12.4	16.6	15.3	17.7	18.4	20.8	21.6	23.3	26.4
Physical sciences .....	1.9	1.9	2.1	2.0	2.4	2.5	3.0	2.6	3.3	3.2	3.7	3.8	4.6	5.6
Mathematics .....	0.2	0.3	0.4	0.4	0.4	0.3	0.5	0.4	0.5	0.7	0.5	0.6	0.8	0.8
Computer sciences .....	NA	NA	NA	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3
Environmental sciences .....	0.3	0.3	0.3	0.5	0.5	0.5	0.7	0.8	0.7	0.9	1.1	1.1	1.4	1.4

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-30.

**Doctoral scientists and engineers employed in academia, by degree field, sex, and type of position: 1973–99**  
(Thousands)

Field of degree and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
Life sciences .....	2.5	2.4	2.8	3.9	4.0	4.6	6.2	6.0	6.7	7.2	7.7	8.4	8.4	9.5
Psychology .....	0.8	1.0	1.2	1.8	2.2	2.2	2.9	2.8	2.9	2.8	3.9	3.9	4.0	4.6
Social sciences .....	1.0	1.5	1.2	1.9	2.0	2.2	3.2	2.6	3.5	3.5	3.7	3.6	3.9	4.3
Engineering .....	0.8	0.9	0.8	0.9	1.1	1.1	1.5	1.1	1.5	1.8	1.5	2.1	3.1	3.0
<b>Male, total S&amp;E</b> .....	<b>6.5</b>	<b>7.2</b>	<b>7.4</b>	<b>9.4</b>	<b>10.0</b>	<b>10.3</b>	<b>14.3</b>	<b>12.0</b>	<b>13.9</b>	<b>14.4</b>	<b>15.4</b>	<b>16.1</b>	<b>18.0</b>	<b>20.5</b>
Total sciences .....	5.8	6.4	6.6	8.6	8.9	9.3	12.8	10.9	12.5	12.8	13.9	14.2	15.3	17.9
Physical sciences .....	1.8	1.8	1.9	1.8	2.1	2.2	2.7	2.2	2.9	2.9	3.3	3.2	4.0	4.9
Mathematics .....	0.2	0.3	0.4	0.3	0.3	0.2	0.4	0.4	0.4	0.6	0.4	0.5	0.7	0.7
Computer sciences .....	NA	NA	NA	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2
Environmental sciences .....	0.3	0.3	0.3	0.5	0.5	0.5	0.7	0.7	0.6	0.7	0.9	0.9	1.2	1.1
Life sciences .....	2.0	1.9	2.2	3.0	3.0	3.2	4.6	4.1	4.6	4.9	5.1	5.6	5.3	6.2
Psychology .....	0.7	0.8	0.9	1.4	1.4	1.4	1.8	1.6	1.5	1.2	1.9	1.7	1.8	2.1
Social sciences .....	0.8	1.3	0.9	1.6	1.6	1.7	2.5	1.8	2.4	2.4	2.2	2.1	2.2	2.6
Engineering .....	0.8	0.9	0.8	0.9	1.1	1.0	1.5	1.0	1.4	1.7	1.5	2.0	2.7	2.6
<b>Female, total S&amp;E</b> .....	<b>1.1</b>	<b>1.0</b>	<b>1.4</b>	<b>2.0</b>	<b>2.6</b>	<b>3.1</b>	<b>3.8</b>	<b>4.5</b>	<b>5.3</b>	<b>5.8</b>	<b>6.7</b>	<b>7.7</b>	<b>8.4</b>	<b>8.8</b>
Total sciences .....	1.1	1.0	1.4	1.9	2.6	3.0	3.8	4.5	5.2	5.6	6.7	7.5	8.2	8.5
Physical sciences .....	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.6	0.7	0.6
Mathematics .....	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.1
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Life sciences .....	0.6	0.5	0.6	0.9	1.0	1.3	1.6	1.8	2.1	2.4	2.6	2.8	3.1	3.3
Psychology .....	0.2	0.2	0.3	0.5	0.8	0.8	1.1	1.3	1.4	1.6	2.0	2.2	2.2	2.5
Social sciences .....	0.2	0.2	0.2	0.3	0.4	0.5	0.7	0.8	1.1	1.1	1.5	1.5	1.7	1.7
Engineering .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.3	0.3
<b>Postdoctoral positions</b>														
All, total S&E .....	4.2	6.2	7.6	8.1	8.5	8.3	8.7	9.3	11.5	9.9	13.3	16.8	18.9	18.5
Total sciences .....	4.0	5.9	7.2	7.8	8.4	8.0	8.5	8.8	10.9	9.4	12.3	15.6	17.2	17.5
Physical sciences .....	1.7	2.1	2.2	1.9	1.9	1.4	1.9	2.0	2.4	1.9	3.0	3.9	3.2	2.9
Mathematics .....	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.1	0.0	0.5	0.5	0.6
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Environmental sciences .....	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.5	0.6	0.5
Life sciences .....	1.9	3.0	4.0	4.7	5.2	5.1	5.2	5.6	6.8	6.4	8.2	9.2	10.8	11.7
Psychology .....	0.2	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.5	0.4	1.1	1.3	1.2
Social sciences .....	0.1	0.2	0.3	0.3	0.3	0.6	0.3	0.1	0.4	0.3	0.2	0.4	0.7	0.5
Engineering .....	0.2	0.3	0.4	0.3	0.2	0.3	0.2	0.5	0.6	0.5	1.0	1.2	1.7	1.1
<b>Male, total S&amp;E</b> .....	<b>3.5</b>	<b>4.9</b>	<b>6.1</b>	<b>6.3</b>	<b>6.3</b>	<b>5.8</b>	<b>6.0</b>	<b>6.8</b>	<b>8.2</b>	<b>6.8</b>	<b>9.2</b>	<b>11.1</b>	<b>12.1</b>	<b>11.2</b>
Total sciences .....	3.4	4.7	5.7	6.0	6.1	5.5	5.9	6.3	7.6	6.4	8.3	10.1	10.6	10.3
Physical sciences .....	1.5	1.9	1.9	1.7	1.6	1.2	1.6	1.7	2.0	1.5	2.5	3.3	2.5	2.3
Mathematics .....	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.3	0.3	0.5
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Environmental sciences .....	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.4
Life sciences .....	1.5	2.2	2.9	3.5	3.6	3.3	3.4	3.8	4.7	4.1	5.2	5.5	6.2	6.6
Psychology .....	0.1	0.2	0.4	0.4	0.5	0.3	0.4	0.3	0.3	0.2	0.1	0.4	0.5	0.3
Social sciences .....	0.1	0.1	0.2	0.2	0.1	0.4	0.2	0.1	0.2	0.2	0.1	0.2	0.5	0.3
Engineering .....	0.2	0.3	0.4	0.3	0.2	0.3	0.2	0.5	0.5	0.4	0.9	1.0	1.4	0.9
<b>Female, total S&amp;E</b> .....	<b>0.6</b>	<b>1.3</b>	<b>1.6</b>	<b>1.8</b>	<b>2.2</b>	<b>2.5</b>	<b>2.6</b>	<b>2.6</b>	<b>3.3</b>	<b>3.0</b>	<b>4.1</b>	<b>5.7</b>	<b>6.8</b>	<b>7.3</b>
Total sciences .....	0.6	1.3	1.6	1.8	2.2	2.5	2.6	2.6	3.3	3.0	4.0	5.5	6.6	7.1
Physical sciences .....	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.6	0.6	0.6	0.6
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-30.

**Doctoral scientists and engineers employed in academia, by degree field, sex, and type of position: 1973–99**  
(Thousands)

Field of degree and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
Life sciences .....	0.4	0.8	1.1	1.2	1.6	1.8	1.8	1.8	2.2	2.3	3.0	3.7	4.6	5.1
Psychology .....	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.5	0.3	0.3	0.7	0.8	0.9
Social sciences .....	0.0	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Engineering .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2
<b>Part-time positions</b>														
<b>All, total S&amp;E .....</b>	<b>2.9</b>	<b>3.2</b>	<b>3.4</b>	<b>4.5</b>	<b>4.0</b>	<b>6.0</b>	<b>6.5</b>	<b>5.7</b>	<b>6.2</b>	<b>7.4</b>	<b>5.9</b>	<b>5.5</b>	<b>8.9</b>	<b>8.2</b>
Total sciences .....	2.8	3.1	3.2	4.3	3.9	5.7	6.2	5.4	5.6	6.9	5.4	5.1	8.6	7.9
Physical sciences .....	0.6	0.6	0.6	0.7	0.6	1.0	0.9	0.6	0.5	0.9	0.7	0.7	1.0	0.7
Mathematics .....	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.7	0.7
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Environmental sciences .....	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3
Life sciences .....	0.9	0.9	1.0	1.2	1.2	1.7	1.7	1.6	1.9	2.3	1.6	1.2	2.9	2.6
Psychology .....	0.4	0.5	0.6	1.0	0.8	1.0	1.0	1.0	1.0	1.2	1.2	1.1	1.1	1.3
Social sciences .....	0.7	0.8	0.8	1.0	1.0	1.6	2.2	1.8	1.7	2.0	1.3	1.3	2.6	2.2
Engineering .....	0.1	0.1	0.1	0.3	0.2	0.4	0.3	0.3	0.5	0.5	0.5	0.4	0.3	0.4
<b>Male, total S&amp;E .....</b>	<b>1.5</b>	<b>1.8</b>	<b>1.8</b>	<b>2.7</b>	<b>1.9</b>	<b>3.5</b>	<b>3.6</b>	<b>2.7</b>	<b>3.1</b>	<b>3.8</b>	<b>2.3</b>	<b>2.4</b>	<b>4.4</b>	<b>3.4</b>
Total sciences .....	1.4	1.7	1.6	2.4	1.7	3.2	3.3	2.5	2.6	3.4	1.9	2.0	4.1	3.2
Physical sciences .....	0.4	0.3	0.4	0.5	0.3	0.8	0.6	0.4	0.3	0.6	0.5	0.5	0.7	0.5
Mathematics .....	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.3	0.3	0.4
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2
Life sciences .....	0.4	0.5	0.4	0.5	0.4	0.7	0.7	0.5	0.8	1.0	0.4	0.3	1.3	0.8
Psychology .....	0.1	0.2	0.2	0.5	0.3	0.4	0.4	0.4	0.3	0.2	0.1	0.1	0.3	0.3
Social sciences .....	0.4	0.5	0.4	0.6	0.5	1.1	1.4	1.0	0.8	1.2	0.5	0.7	1.4	1.0
Engineering .....	0.1	0.1	0.1	0.3	0.2	0.3	0.3	0.3	0.5	0.5	0.4	0.3	0.2	0.2
<b>Female, total S&amp;E .....</b>	<b>1.4</b>	<b>1.5</b>	<b>1.6</b>	<b>1.9</b>	<b>2.1</b>	<b>2.5</b>	<b>2.9</b>	<b>3.0</b>	<b>3.1</b>	<b>3.5</b>	<b>3.6</b>	<b>3.1</b>	<b>4.5</b>	<b>4.9</b>
Total sciences .....	1.4	1.5	1.6	1.9	2.1	2.5	2.9	2.9	3.1	3.5	3.5	3.1	4.4	4.7
Physical sciences .....	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.3
Mathematics .....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.3
Computer sciences .....	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
Life sciences .....	0.5	0.5	0.6	0.6	0.7	0.9	1.0	1.1	1.1	1.3	1.2	0.9	1.6	1.8
Psychology .....	0.3	0.3	0.4	0.5	0.5	0.6	0.7	0.7	0.7	0.9	1.1	1.0	0.8	1.0
Social sciences .....	0.3	0.3	0.3	0.4	0.5	0.5	0.9	0.8	0.8	0.8	0.8	0.7	1.2	1.2
Engineering .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2

NA = not available

NOTES: Data exclude scientists and engineers with doctorates from foreign institutions. Faculty is defined by position. Senior faculty includes full and associate professors; junior faculty members are either assistant professors or instructors. Details may not add to total because of rounding.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients, unpublished tabulations.

Appendix table 5-31.

**Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973–99**  
 (Thousands)

Field of degree and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Total academic employment</b>														
<b>All, total S&amp;E</b>	118.0	134.1	145.4	155.3	167.1	176.1	190.2	195.9	206.6	210.6	213.8	217.5	232.5	240.2
Total sciences	105.6	120.6	130.7	139.5	150.9	157.9	170.3	174.7	183.8	187.8	190.6	193.7	205.9	214.7
Physical sciences	22.1	23.6	25.0	24.6	25.3	25.1	27.0	27.2	27.7	27.7	28.6	29.4	30.2	30.9
Mathematics	9.7	11.0	11.7	12.2	12.4	12.9	13.6	13.8	14.5	15.2	15.5	14.6	15.6	15.2
Computer sciences	0.0	0.0	0.0	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.1	3.3	3.7
Environmental sciences	3.4	3.9	4.2	4.2	4.6	4.8	5.2	5.6	5.9	6.1	6.4	6.4	7.3	7.8
Life sciences	34.9	39.4	42.6	47.0	51.3	54.8	58.7	61.2	64.8	66.9	68.2	71.6	77.3	81.9
Psychology	12.2	14.8	16.2	17.7	20.1	21.0	23.1	23.7	25.0	25.2	25.0	26.1	27.3	29.0
Social sciences	23.4	28.0	31.1	33.6	36.9	38.8	41.9	42.1	44.5	44.8	44.4	42.5	44.9	46.2
Engineering	12.4	13.4	14.8	15.8	16.1	18.1	19.9	21.2	22.8	22.8	23.1	23.8	26.6	25.5
<b>White, total S&amp;E</b>	107.7	121.6	131.4	140.0	149.9	157.2	168.4	172.8	181.0	183.5	181.8	182.6	193.2	198.2
Total sciences	96.9	109.9	118.8	126.5	135.9	142.0	152.0	155.7	163.0	165.3	164.3	165.0	173.0	178.8
Physical sciences	19.7	21.1	22.1	21.9	22.3	21.9	23.4	23.3	23.7	23.8	23.4	23.8	24.4	25.3
Mathematics	8.8	10.0	10.6	10.8	11.0	11.5	11.9	12.2	12.6	13.0	12.9	12.0	12.6	12.3
Computer sciences	0.0	0.0	0.0	0.1	0.2	0.4	0.6	0.9	1.1	1.4	1.6	2.1	2.2	2.7
Environmental sciences	3.3	3.7	4.0	4.0	4.3	4.5	4.9	5.2	5.5	5.7	5.9	5.7	6.6	7.0
Life sciences	32.1	35.8	38.8	42.4	46.1	49.3	52.7	54.6	57.6	59.2	59.1	61.3	64.9	67.2
Psychology	11.6	13.9	15.2	16.8	18.8	19.6	21.3	22.0	23.2	23.2	22.9	23.6	24.4	25.5
Social sciences	21.4	25.3	28.2	30.5	33.1	34.7	37.2	37.5	39.4	39.1	38.6	36.5	38.0	38.9
Engineering	10.8	11.6	12.6	13.5	14.0	15.2	16.4	17.2	18.1	18.2	17.5	17.6	20.2	19.4
<b>Asian/Pacific Islander, total S&amp;E</b>	5.0	6.1	6.7	9.8	10.8	11.8	14.0	15.0	16.3	16.8	20.9	22.4	25.4	26.3
Total sciences	4.0	5.0	5.4	7.8	9.1	9.4	11.1	11.5	12.2	13.1	16.2	17.5	20.3	21.7
Physical sciences	1.1	1.3	1.4	1.8	2.0	2.2	2.6	2.9	2.8	2.6	3.8	4.1	4.1	4.0
Mathematics	0.4	0.5	0.5	0.9	0.9	1.0	1.1	1.1	1.3	1.6	1.9	1.8	2.2	2.1
Computer sciences	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.5	0.7	0.9	0.9	0.9
Environmental sciences	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.3	0.2	0.4	0.5	0.5	0.6
Life sciences	1.3	1.8	2.0	3.1	3.6	3.6	4.0	4.4	4.7	5.1	6.3	6.8	8.5	9.9
Psychology	0.1	0.1	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.7	0.8
Social sciences	1.0	1.1	1.2	1.6	2.0	2.0	2.5	2.2	2.4	2.6	2.7	2.8	3.2	3.5
Engineering	1.1	1.1	1.3	1.9	1.8	2.4	3.0	3.5	4.1	3.7	4.7	4.9	5.2	4.6
<b>Underrepresented minorities, total S&amp;E</b>	2.4	3.2	3.7	4.9	5.8	6.5	7.2	7.8	9.0	9.9	10.7	12.4	13.7	15.6
Total sciences	2.2	2.9	3.4	4.5	5.5	6.0	6.7	7.2	8.3	9.0	9.8	11.2	12.6	14.1
Physical sciences	0.5	0.5	0.5	0.7	0.9	0.9	0.9	1.0	1.1	1.2	1.4	1.4	1.7	1.6
Mathematics	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.5	0.7	0.8	0.7	0.8
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.2
Environmental sciences	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Life sciences	0.8	1.1	1.2	1.3	1.5	1.7	1.8	2.1	2.4	2.6	2.7	3.5	3.9	4.7
Psychology	0.3	0.4	0.6	0.5	0.8	1.0	1.2	1.2	1.3	1.5	1.6	2.0	2.3	2.7
Social sciences	0.5	0.8	0.8	1.5	1.8	2.0	2.1	2.3	2.8	3.0	3.1	3.2	3.6	3.9
Engineering	0.2	0.2	0.3	0.4	0.3	0.5	0.5	0.5	0.7	0.9	0.9	1.2	1.2	1.5
<b>Black, total S&amp;E</b>	1.3	1.7	1.7	1.9	2.6	3.1	3.3	3.5	3.8	4.6	4.8	5.8	6.6	7.3
Total sciences	1.2	1.6	1.7	1.9	2.5	2.9	3.2	3.3	3.5	4.2	4.5	5.4	6.1	6.6
Physical sciences	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.5	0.7	0.6	0.6
Mathematics	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Life sciences	0.4	0.6	0.6	0.6	0.6	0.8	0.9	0.9	1.0	1.2	1.3	1.7	1.9	2.1
Psychology	0.2	0.2	0.3	0.3	0.4	0.6	0.6	0.7	0.7	0.8	0.9	1.0	1.2	1.4
Social sciences	0.3	0.5	0.5	0.7	1.0	1.1	1.3	1.2	1.2	1.6	1.6	1.7	2.0	2.0
Engineering	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.4	0.3	0.5	0.5	0.7

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-31.

**Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973–99**  
 (Thousands)

Field of degree and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Hispanic, total S&amp;E</b> .....	0.9	1.2	1.6	2.4	2.5	2.6	3.1	3.4	4.3	4.5	5.0	5.7	6.2	7.3
Total sciences .....	0.8	1.1	1.4	2.1	2.4	2.4	2.8	3.1	3.9	4.1	4.4	5.0	5.6	6.6
Physical sciences .....	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.8	0.8	0.8	0.9	0.8
Mathematics .....	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.5
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Environmental sciences .....	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Life sciences .....	0.4	0.4	0.5	0.7	0.8	0.8	0.8	1.0	1.2	1.2	1.3	1.6	1.8	2.3
Psychology .....	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.8	1.0	1.1
Social sciences .....	0.1	0.2	0.2	0.6	0.5	0.6	0.7	0.8	1.1	1.1	1.2	1.1	1.3	1.6
Engineering .....	0.1	0.1	0.2	0.3	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.7	0.6	0.7
<b>American Indian/Alaskan Native, total S&amp;E</b> .....	0.2	0.3	0.4	0.6	0.7	0.7	0.8	0.8	1.0	0.8	0.9	0.9	0.9	1.0
Total sciences .....	0.2	0.3	0.3	0.6	0.7	0.7	0.7	0.8	0.9	0.8	0.9	0.8	0.8	0.9
Physical sciences .....	0.0	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.2
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences .....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Psychology .....	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Social sciences .....	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.5	0.3	0.4	0.3	0.3	0.3
Engineering .....	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
<b>Full-time faculty</b>														
<b>All, total S&amp;E</b> .....	103.3	116.4	125.6	131.2	141.9	148.4	156.9	164.4	169.8	173.1	172.4	171.4	178.4	184.0
Total sciences .....	92.0	104.2	112.2	116.9	127.2	132.0	139.0	145.1	149.5	153.1	152.2	151.3	156.8	163.0
Physical sciences .....	17.8	18.9	20.0	20.0	20.5	20.2	21.2	22.0	21.5	21.7	21.3	20.9	21.4	21.7
Mathematics .....	9.3	10.4	10.9	11.4	11.7	12.3	12.7	12.9	13.5	14.2	14.7	13.0	13.6	13.1
Computer sciences .....	0.0	0.0	0.0	0.1	0.3	0.4	0.7	0.9	1.3	1.8	2.3	2.8	3.0	3.3
Environmental sciences .....	3.0	3.4	3.6	3.5	3.8	4.0	4.2	4.4	4.7	4.5	4.5	4.7	5.1	5.6
Life sciences .....	29.5	33.1	34.9	37.3	40.9	43.5	45.6	48.1	49.3	51.1	50.8	52.8	55.2	58.1
Psychology .....	10.8	12.8	13.9	14.3	16.4	17.3	18.5	19.2	20.2	20.7	19.5	20.1	20.8	21.9
Social sciences .....	21.6	25.5	28.8	30.3	33.7	34.4	36.1	37.6	39.0	39.0	39.2	37.1	37.7	39.2
Engineering .....	11.3	12.2	13.5	14.3	14.7	16.4	17.9	19.3	20.2	20.1	20.1	20.0	21.5	21.1
<b>White, total S&amp;E</b> .....	94.9	106.2	114.3	118.7	128.1	133.4	139.7	146.2	149.8	151.8	148.7	147.1	151.1	155.4
Total sciences .....	84.9	95.6	102.6	106.5	115.4	119.4	124.9	130.3	133.6	135.7	133.1	131.7	134.5	139.3
Physical sciences .....	16.1	17.2	18.0	18.0	18.5	17.8	18.8	19.3	18.9	18.9	18.0	17.8	17.9	18.3
Mathematics .....	8.5	9.5	9.9	10.1	10.3	10.9	11.1	11.4	11.7	12.2	12.3	10.7	11.0	10.7
Computer sciences .....	0.0	0.0	0.0	0.0	0.2	0.3	0.5	0.7	1.0	1.3	1.5	1.9	2.0	2.4
Environmental sciences .....	2.9	3.3	3.5	3.3	3.6	3.8	4.0	4.1	4.4	4.3	4.2	4.3	4.7	5.1
Life sciences .....	27.5	30.4	32.1	33.9	37.2	39.7	41.3	43.3	44.4	46.0	45.1	46.7	48.3	50.2
Psychology .....	10.3	12.1	13.0	13.6	15.4	16.2	17.1	17.9	18.8	19.2	18.0	18.4	18.8	19.6
Social sciences .....	19.7	23.2	26.1	27.5	30.1	30.7	32.2	33.5	34.4	33.8	34.1	31.9	31.8	33.0
Engineering .....	10.0	10.6	11.6	12.2	12.7	14.0	14.8	15.9	16.2	16.2	15.6	15.3	16.7	16.1
<b>Asian/Pacific Islander, total S&amp;E</b> .....	4.0	4.7	5.0	7.8	8.4	9.1	10.9	11.7	12.3	12.6	14.8	14.5	16.5	17.0
Total sciences .....	3.0	3.7	3.9	6.0	6.7	7.2	8.2	8.7	8.9	9.5	11.1	10.9	12.7	13.2
Physical sciences .....	0.7	0.8	0.9	1.3	1.2	1.5	1.6	1.8	1.7	1.7	2.2	2.0	2.2	2.2
Mathematics .....	0.4	0.5	0.5	0.8	0.9	1.0	1.1	1.1	1.3	1.5	1.7	1.6	2.0	1.7
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.5	0.7	0.8	0.8	0.8
Environmental sciences .....	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.3	0.2	0.3
Life sciences .....	0.9	1.2	1.2	2.1	2.3	2.4	2.8	3.1	3.0	3.0	3.7	3.5	4.1	4.9
Psychology .....	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Social sciences .....	0.9	1.1	1.1	1.5	1.9	1.9	2.1	2.1	2.1	2.4	2.3	2.4	2.8	2.9
Engineering .....	0.9	1.0	1.1	1.8	1.7	1.9	2.7	3.0	3.4	3.1	3.7	3.6	3.8	3.8

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-31.

**Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973–99**  
 (Thousands)

Field of degree and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Underrepresented minorities, total S&amp;E .</b>	2.0	2.7	3.2	4.2	5.0	5.4	5.8	6.3	7.4	8.4	8.6	9.8	10.6	11.6
Total sciences .....	1.9	2.5	2.9	3.9	4.8	5.0	5.4	5.9	6.8	7.6	7.8	8.7	9.6	10.4
Physical sciences .....	0.4	0.4	0.4	0.6	0.8	0.8	0.7	0.8	0.8	1.0	1.1	1.0	1.3	1.3
Mathematics .....	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.7	0.6	0.7
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2
Environmental sciences .....	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Life sciences .....	0.7	0.9	1.0	1.1	1.3	1.3	1.4	1.6	1.8	2.0	2.0	2.6	2.7	3.1
Psychology .....	0.2	0.3	0.5	0.4	0.6	0.7	0.9	0.9	1.0	1.1	1.1	1.3	1.5	1.8
Social sciences .....	0.4	0.6	0.8	1.4	1.6	1.7	1.8	2.0	2.5	2.8	2.8	2.8	3.1	3.3
Engineering .....	0.1	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.8	0.8	1.1	1.0	1.1
<b>Black, total S&amp;E .....</b>	1.1	1.4	1.5	1.7	2.3	2.5	2.7	2.8	3.2	4.0	3.8	4.6	5.0	5.5
Total sciences .....	1.1	1.3	1.5	1.6	2.1	2.3	2.6	2.6	3.0	3.6	3.5	4.2	4.5	4.9
Physical sciences .....	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.3	0.3	0.3	0.4	0.6	0.5
Mathematics .....	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences .....	0.3	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.8	1.0	1.0	1.3	1.3	1.4
Psychology .....	0.1	0.2	0.3	0.2	0.4	0.4	0.5	0.5	0.6	0.7	0.6	0.6	0.7	1.0
Social sciences .....	0.3	0.4	0.4	0.6	0.9	0.9	1.1	1.0	1.1	1.5	1.4	1.5	1.7	1.7
Engineering .....	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.5	0.4	0.6
<b>Hispanic, total S&amp;E .....</b>	0.7	1.0	1.3	2.0	2.1	2.2	2.4	2.7	3.3	3.7	3.9	4.4	4.8	5.2
Total sciences .....	0.6	0.9	1.2	1.7	2.0	2.0	2.2	2.5	3.0	3.3	3.5	3.8	4.3	4.7
Physical sciences .....	0.1	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.4	0.6	0.6	0.5	0.7	0.7
Mathematics .....	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.5
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Environmental sciences .....	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Life sciences .....	0.3	0.4	0.4	0.5	0.7	0.6	0.6	0.8	0.9	0.9	0.9	1.2	1.3	1.5
Psychology .....	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.7	0.7
Social sciences .....	0.1	0.2	0.2	0.5	0.5	0.5	0.5	0.7	0.9	1.0	1.0	1.0	1.1	1.3
Engineering .....	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.6	0.5	0.5
<b>American Indian/Alaskan Native, total S&amp;E .....</b>	0.2	0.3	0.4	0.6	0.6	0.7	0.7	0.8	0.9	0.8	0.8	0.8	0.8	0.8
Total sciences .....	0.2	0.3	0.3	0.6	0.6	0.6	0.6	0.7	0.8	0.7	0.8	0.7	0.7	0.7
Physical sciences .....	0.0	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences .....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Psychology .....	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Social sciences .....	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.2
Engineering .....	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1
<b>Postdoctorate positions</b>														
<b>All, total S&amp;E .....</b>	4.2	6.2	7.6	8.1	8.5	8.3	8.7	9.3	11.5	9.9	13.3	16.8	18.9	18.5
Total sciences .....	4.0	5.9	7.2	7.8	8.4	8.0	8.5	8.8	10.9	9.4	12.3	15.6	17.2	17.5
Physical sciences .....	1.7	2.1	2.2	1.9	1.9	1.4	1.9	2.0	2.4	1.9	3.0	3.9	3.2	2.9
Mathematics .....	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.1	0.0	0.5	0.5	0.6
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Environmental sciences .....	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.5	0.6	0.5
Life sciences .....	1.9	3.0	4.0	4.7	5.2	5.1	5.2	5.6	6.8	6.4	8.2	9.2	10.8	11.7
Psychology .....	0.2	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.5	0.4	1.1	1.3	1.2
Social sciences .....	0.1	0.2	0.3	0.3	0.3	0.6	0.3	0.1	0.4	0.3	0.2	0.4	0.7	0.5
Engineering .....	0.2	0.3	0.4	0.3	0.2	0.3	0.2	0.5	0.6	0.5	1.0	1.2	1.7	1.1

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-31.

**Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973–99**  
 (Thousands)

Field of degree and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>White, total S&amp;E</b>	3.6	5.0	6.2	6.8	6.9	6.8	7.1	7.4	9.0	7.1	9.1	11.2	12.5	11.9
Total sciences	3.4	4.8	6.0	6.7	6.7	6.8	7.0	7.2	8.7	6.9	8.8	10.7	11.6	11.2
Physical sciences	1.4	1.7	1.7	1.5	1.3	1.2	1.3	1.3	1.6	1.2	2.0	2.3	2.0	1.8
Mathematics	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.3	0.3	0.5
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Environmental sciences	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.4	0.3	0.5	0.5
Life sciences	1.7	2.4	3.3	4.1	4.4	4.3	4.5	4.7	5.6	4.8	5.9	6.5	7.0	7.2
Psychology	0.1	0.4	0.4	0.6	0.6	0.5	0.7	0.6	0.8	0.4	0.3	0.9	1.1	0.9
Social sciences	0.1	0.2	0.3	0.3	0.3	0.5	0.3	0.1	0.3	0.2	0.1	0.3	0.6	0.3
Engineering	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.2	0.3	0.5	0.9	0.7
<b>Asian/Pacific Islander, total S&amp;E</b>	0.5	1.0	1.1	1.1	1.4	1.1	1.1	1.6	1.9	2.3	3.6	4.7	5.3	5.2
Total sciences	0.4	0.9	1.0	1.0	1.4	0.9	1.1	1.3	1.6	2.0	2.9	4.0	4.7	4.9
Physical sciences	0.2	0.4	0.4	0.4	0.6	0.2	0.5	0.6	0.7	0.6	0.9	1.4	1.1	1.1
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0
Life sciences	0.2	0.5	0.5	0.5	0.8	0.6	0.6	0.6	0.9	1.3	1.9	2.2	3.2	3.6
Psychology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Social sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Engineering	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.7	0.7	0.7	0.2
<b>Underrepresented minorities, total S&amp;E</b>	0.1	0.1	0.2	0.2	0.2	0.4	0.4	0.4	0.6	0.4	0.6	0.9	1.1	1.5
Total sciences	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.3	0.5	0.4	0.6	0.9	1.0	1.4
Physical sciences	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.4	0.5	0.6	0.8
Psychology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.2
Social sciences	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Engineering	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
<b>Black, total S&amp;E</b>	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.5	0.5
Total sciences	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.5	0.5
Physical sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.3
Psychology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Social sciences	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
<b>Hispanic, total S&amp;E</b>	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.4	0.3	0.4	0.6	0.5	0.9
Total sciences	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.4	0.3	0.4	0.6	0.5	0.8
Physical sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.5
Psychology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1
Social sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Engineering	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-31.

**Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973–99**  
 (Thousands)

Field of degree and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>American Indian/Alaskan Native, total S&amp;E</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Total sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Physical sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Psychology .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Social sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engineering .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Full-time nonfaculty and part-time positions</b>														
<b>All, total S&amp;E</b>	10.5	11.5	12.2	15.9	16.6	19.4	24.6	22.1	25.4	27.6	28.1	29.4	35.3	37.5
Total sciences .....	9.6	10.5	11.3	14.8	15.3	18.0	22.8	20.7	23.3	25.4	26	26.8	31.9	34.2
Physical sciences .....	2.6	2.5	2.7	2.7	3.0	3.5	3.9	3.3	3.8	4.2	4.4	4.5	5.6	6.3
Mathematics .....	0.4	0.6	0.7	0.7	0.6	0.5	0.7	0.6	0.8	0.9	0.8	1.1	1.5	1.5
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.3	0.3
Environmental sciences .....	0.3	0.4	0.4	0.6	0.6	0.7	0.9	0.9	0.9	1.2	1.4	1.3	1.6	1.7
Life sciences .....	3.4	3.3	3.7	5.0	5.2	6.3	7.8	7.6	8.7	9.5	9.2	9.6	11.3	12.0
Psychology .....	1.2	1.5	1.8	2.8	3.0	3.1	3.9	3.8	4.0	4.0	5.1	5.0	5.2	5.9
Social sciences .....	1.6	2.2	1.9	2.9	2.9	3.8	5.5	4.3	5.1	5.5	5.0	5.0	6.5	6.5
Engineering .....	0.9	1.0	0.9	1.2	1.3	1.4	1.8	1.4	2.0	2.2	2.0	2.5	3.4	3.3
<b>White non-Hispanic, total S&amp;E</b>	9.3	10.4	10.9	14.5	15.0	17.0	21.6	19.3	22.2	24.6	24.0	24.3	29.6	31.0
Total sciences .....	8.6	9.5	10.1	13.4	13.7	15.8	20.0	18.2	20.6	22.8	22.4	22.5	27.0	28.3
Physical sciences .....	2.2	2.3	2.4	2.5	2.6	3.0	3.3	2.7	3.2	3.6	3.5	3.7	4.4	5.2
Mathematics .....	0.3	0.5	0.6	0.6	0.6	0.5	0.7	0.6	0.7	0.8	0.6	0.9	1.2	1.1
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2
Environmental sciences .....	0.3	0.4	0.4	0.6	0.6	0.6	0.8	0.9	0.8	1.2	1.3	1.1	1.5	1.4
Life sciences .....	3.0	2.9	3.3	4.4	4.5	5.3	6.9	6.6	7.5	8.4	8.1	8.1	9.5	9.8
Psychology .....	1.1	1.5	1.7	2.6	2.8	2.9	3.5	3.5	3.6	3.6	4.5	4.3	4.5	5.0
Social sciences .....	1.5	2.0	1.7	2.7	2.7	3.5	4.7	3.9	4.7	5.1	4.4	4.3	5.6	5.5
Engineering .....	0.7	0.9	0.8	1.1	1.2	1.1	1.6	1.1	1.6	1.8	1.6	1.8	2.7	2.6
<b>Asian/Pacific Islander, total S&amp;E</b>	0.6	0.4	0.6	0.9	1.0	1.6	2.0	1.8	2.0	1.9	2.5	3.2	3.6	4.1
Total sciences .....	0.5	0.4	0.5	0.9	1.0	1.4	1.8	1.5	1.7	1.5	2.2	2.6	2.9	3.5
Physical sciences .....	0.2	0.1	0.1	0.2	0.2	0.5	0.5	0.5	0.5	0.4	0.7	0.7	0.9	0.8
Mathematics .....	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.2
Life sciences .....	0.2	0.1	0.3	0.4	0.6	0.7	0.7	0.7	0.9	0.8	0.8	1.1	1.2	1.5
Psychology .....	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Social sciences .....	0.0	0.1	0.1	0.1	0.1	0.1	0.4	0.2	0.2	0.2	0.3	0.3	0.4	0.5
Engineering .....	0.1	0.0	0.1	0.1	0.0	0.2	0.2	0.3	0.4	0.3	0.3	0.6	0.6	0.6
<b>Underrepresented minorities, total S&amp;E</b>	0.3	0.4	0.3	0.5	0.5	0.8	1.0	1.1	1.1	1.1	1.5	1.8	2.1	2.5
Total sciences .....	0.3	0.4	0.3	0.4	0.5	0.7	0.9	1.0	1.0	1.0	1.4	1.7	2.0	2.4
Physical sciences .....	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences .....	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.6	0.8
Psychology .....	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.6	0.7
Social sciences .....	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.5	0.5
Engineering .....	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-31.

**Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973–99**  
 (Thousands)

Field of degree and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Black, total S&amp;E</b> .....	0.2	0.2	0.2	0.2	0.3	0.5	0.4	0.6	0.4	0.5	0.7	0.9	1.2	1.2
Total sciences .....	0.2	0.2	0.2	0.2	0.3	0.5	0.4	0.6	0.4	0.5	0.7	0.9	1.1	1.2
Physical sciences .....	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences .....	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.3	0.4
Psychology .....	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.4	0.4	0.3
Social sciences .....	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.3
Engineering .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Hispanic, total S&amp;E</b> .....	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.5	0.6	0.5	0.7	0.7	0.8	1.2
Total sciences .....	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.8	1.1
Physical sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences .....	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.3	0.3
Psychology .....	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3
Social sciences .....	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Engineering .....	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1
<b>American Indian/Alaskan Native,</b>														
<b>total S&amp;E</b> .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Total sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Physical sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Psychology .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Social sciences .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engineering .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

NA = not available

NOTES: Data exclude university-managed federally funded research and development centers. Because of survey coverage, data also exclude scientists and engineers with doctorates from foreign institutions. Faculty positions include full, associate, and assistant professors and instructors. Respondents with unknown racial/ethnic classification or faculty status are excluded. Underrepresented minorities are black, Hispanic, and American Indian/Alaskan Native, respondents. Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients, unpublished tabulations.

See figure 5-26.

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Science & Engineering Indicators – 2002

Appendix table 5-32.

**Academic doctoral scientists and engineers, by primary work activity: 1973–99**  
 (Thousands)

Year	Total employment				Full-time faculty			
	Total	Research	Teaching	Other	Total	Research	Teaching	Other
<b>S&amp;E total</b>								
1973 .....	118.0	27.8	73.3	15.0	103.3	19.8	69.9	12.0
1975 .....	134.1	30.8	83.8	16.4	116.4	21.4	80.2	12.2
1977 .....	145.4	37.0	82.2	23.8	125.6	25.8	78.4	19.6
1979 .....	155.3	41.3	83.8	29.1	131.2	28.1	79.7	22.6
1981 .....	167.1	46.5	95.9	23.0	141.9	31.8	92.1	16.7
1983 .....	176.1	48.9	97.7	28.1	148.4	33.6	91.9	21.8
1985 .....	190.2	55.9	101.0	30.5	156.9	39.5	94.9	20.3
1987 .....	195.9	66.5	99.3	29.5	164.4	48.6	93.6	21.8
1989 .....	206.6	72.2	100.9	32.6	169.8	51.6	93.9	23.4
1991 .....	210.6	73.9	103.4	32.3	173.1	53.8	96.7	22.4
1993 .....	213.8	80.2	98.3	35.2	172.4	56.8	91.4	24.1
1995 .....	217.5	83.0	100.2	34.3	171.4	56.6	91.9	22.9
1997 .....	232.5	88.6	105.4	38.6	178.4	58.0	95.4	24.9
1999 .....	240.2	91.4	108.6	40.2	184.0	60.4	98.6	25.0
<b>Physical sciences</b>								
1973 .....	22.1	5.9	14.0	1.9	17.8	3.0	13.3	1.3
1975 .....	23.6	6.4	14.6	2.1	18.9	3.4	13.9	1.3
1977 .....	25.0	7.9	13.8	3.0	20.0	4.4	13.1	2.3
1979 .....	24.6	7.5	13.4	3.6	20.0	4.4	12.7	2.7
1981 .....	25.3	8.0	14.7	2.4	20.5	4.6	14.1	1.6
1983 .....	25.1	7.7	14.0	3.1	20.2	4.5	13.1	2.4
1985 .....	27.0	9.4	14.4	3.0	21.2	5.6	13.6	1.9
1987 .....	27.2	10.2	14.0	2.9	22.0	6.5	13.4	2.0
1989 .....	27.7	10.9	13.7	3.0	21.5	6.5	12.8	2.2
1991 .....	27.7	10.6	13.8	3.1	21.7	6.7	12.8	2.1
1993 .....	28.6	12.0	12.8	3.8	21.3	7.1	11.8	2.3
1995 .....	29.4	12.6	12.9	3.8	20.9	6.9	11.6	2.3
1997 .....	30.2	12.7	13.5	4.0	21.4	6.8	12.2	2.4
1999 .....	30.9	12.2	14.0	4.7	21.7	6.7	12.7	2.3
<b>Mathematics</b>								
1973 .....	9.7	1.5	7.4	0.6	9.3	1.4	7.2	0.6
1975 .....	11.0	1.5	8.5	0.9	10.4	1.3	8.2	0.7
1977 .....	11.7	1.8	8.5	1.2	10.9	1.6	8.1	1.1
1979 .....	12.2	2.1	8.6	1.4	11.4	1.8	8.3	1.3
1981 .....	12.4	1.9	9.1	1.2	11.7	1.8	8.8	1.0
1983 .....	12.9	2.0	9.4	1.4	12.3	1.8	9.0	1.3
1985 .....	13.6	2.7	9.3	1.4	12.7	2.5	8.9	1.2
1987 .....	13.8	3.2	9.2	1.3	12.9	2.7	9.0	1.2
1989 .....	14.5	3.5	9.5	1.4	13.5	3.2	9.0	1.2
1991 .....	15.2	3.5	10.1	1.5	14.2	3.2	9.6	1.3
1993 .....	15.5	3.4	10.3	1.8	14.7	3.1	10.0	1.6
1995 .....	14.6	3.3	9.8	1.5	13.0	2.7	9.0	1.3
1997 .....	15.6	3.5	10.2	1.8	13.6	2.8	9.3	1.5
1999 .....	15.2	2.9	10.5	1.7	13.1	2.3	9.4	1.4
<b>Computer sciences</b>								
1973 .....	NA	NA	NA	NA	NA	NA	NA	NA
1975 .....	NA	NA	NA	NA	NA	NA	NA	NA
1977 .....	NA	NA	NA	NA	NA	NA	NA	NA
1979 .....	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0
1981 .....	0.3	0.1	0.2	0.0	0.3	0.1	0.2	0.0
1983 .....	0.5	0.2	0.3	0.0	0.4	0.1	0.3	0.0
1985 .....	0.8	0.4	0.3	0.1	0.7	0.3	0.3	0.1
1987 .....	1.1	0.7	0.3	0.1	0.9	0.5	0.3	0.0
1989 .....	1.5	0.8	0.6	0.1	1.3	0.7	0.5	0.1
1991 .....	2.0	1.1	0.7	0.2	1.8	1.0	0.7	0.1
1993 .....	2.5	0.9	1.4	0.2	2.3	0.7	1.3	0.2
1995 .....	3.1	1.0	1.8	0.3	2.8	0.9	1.7	0.2
1997 .....	3.3	1.1	1.8	0.5	3.0	1.0	1.7	0.3
1999 .....	3.7	1.1	2.1	0.5	3.3	0.9	2.0	0.3

See explanatory notes, and SOURCE, if any, at end of table

Appendix table 5-32.

**Academic doctoral scientists and engineers, by primary work activity: 1973–99**  
 (Thousands)

Year	Total employment				Full-time faculty			
	Total	Research	Teaching	Other	Total	Research	Teaching	Other
<b>Earth, atmospheric, and ocean sciences</b>								
1973 .....	3.4	0.7	2.3	0.4	3.0	0.5	2.2	0.3
1975 .....	3.9	0.8	2.7	0.3	3.4	0.5	2.6	0.2
1977 .....	4.2	1.0	2.7	0.4	3.6	0.6	2.6	0.3
1979 .....	4.2	1.0	2.5	0.7	3.5	0.6	2.4	0.5
1981 .....	4.6	1.4	2.8	0.4	3.8	0.8	2.8	0.2
1983 .....	4.8	1.5	2.8	0.5	4.0	0.9	2.7	0.4
1985 .....	5.2	1.6	3.0	0.6	4.2	0.9	2.9	0.4
1987 .....	5.6	2.1	2.9	0.5	4.4	1.3	2.8	0.3
1989 .....	5.9	2.4	3.0	0.5	4.7	1.5	2.8	0.3
1991 .....	6.0	2.5	3.0	0.5	4.5	1.5	2.8	0.2
1993 .....	6.4	2.7	2.9	0.8	4.5	1.6	2.5	0.4
1995 .....	6.4	2.6	3.0	0.8	4.7	1.5	2.8	0.4
1997 .....	7.3	2.9	3.2	1.2	5.1	1.6	2.9	0.6
1999 .....	7.8	2.9	3.8	1.1	5.6	1.5	3.4	0.7
<b>Life sciences</b>								
1973 .....	34.9	12.8	16.6	4.9	29.5	9.3	15.7	3.9
1975 .....	39.4	14.5	19.0	4.8	33.1	10.3	18.1	3.7
1977 .....	42.6	16.6	18.1	7.3	34.9	11.4	17.1	6.0
1979 .....	47.0	19.7	18.1	9.0	37.3	13.1	17.1	6.9
1981 .....	51.3	23.2	20.5	7.0	40.9	15.5	19.6	5.3
1983 .....	54.9	24.3	21.1	8.9	43.5	16.5	19.6	7.0
1985 .....	58.7	27.1	20.9	9.7	45.6	18.6	19.5	6.7
1987 .....	61.3	31.5	20.1	9.5	48.1	22.3	18.7	7.1
1989 .....	64.8	33.8	20.3	10.3	49.3	22.6	18.7	7.6
1991 .....	66.9	34.5	20.9	11.3	51.1	23.8	19.1	8.1
1993 .....	68.2	36.0	20.2	12.0	50.8	24.1	18.4	8.3
1995 .....	71.6	37.7	21.8	12.2	52.8	24.7	19.8	8.3
1997 .....	77.3	40.5	23.4	13.4	55.2	25.7	20.7	8.7
1999 .....	81.9	43.2	25.1	13.6	58.1	27.0	22.5	8.6
<b>Psychology</b>								
1973 .....	12.2	2.0	7.7	2.3	10.8	1.6	7.3	1.8
1975 .....	14.8	2.2	9.7	2.7	12.8	1.5	9.2	1.9
1977 .....	16.2	2.8	9.4	3.8	13.9	2.0	8.9	2.8
1979 .....	17.7	3.4	9.5	4.6	14.3	2.2	8.9	3.2
1981 .....	20.1	4.1	11.7	4.3	16.4	2.5	11.0	2.9
1983 .....	21.0	4.4	11.6	4.9	17.3	2.9	10.9	3.4
1985 .....	23.1	4.6	12.3	5.9	18.5	3.3	11.6	3.4
1987 .....	23.7	5.2	13.0	5.6	19.2	3.9	12.1	3.3
1989 .....	25.0	5.9	12.8	6.2	20.2	4.5	11.9	3.6
1991 .....	25.2	6.2	12.8	6.1	20.7	5.0	12.2	3.6
1993 .....	25.0	6.7	11.6	6.7	19.5	5.3	10.5	3.7
1995 .....	26.1	7.4	11.9	6.9	20.1	5.4	10.9	3.8
1997 .....	27.3	8.0	12.4	7.0	20.8	5.9	11.3	3.6
1999 .....	29.0	8.6	13.0	7.3	21.9	6.1	11.9	3.9
<b>Social sciences</b>								
1973 .....	23.4	2.8	16.9	3.1	21.6	2.5	16.1	2.6
1975 .....	28.0	3.2	20.5	3.6	25.5	2.7	19.5	2.6
1977 .....	31.1	4.1	21.0	5.2	28.8	3.6	20.1	4.5
1979 .....	33.6	4.2	22.6	6.5	30.4	3.4	21.4	5.3
1981 .....	36.9	4.5	26.8	5.1	33.7	3.8	25.7	3.8
1983 .....	38.9	4.9	27.7	5.9	34.4	3.8	25.9	4.5
1985 .....	42.0	5.7	29.1	6.3	36.1	4.6	26.8	4.0
1987 .....	42.2	7.5	28.5	6.0	37.7	6.3	26.5	4.7
1989 .....	44.5	8.2	28.8	7.4	39.0	7.1	26.4	5.3
1991 .....	44.8	8.4	29.8	6.4	39.0	7.1	27.6	4.2
1993 .....	44.4	10.7	27.6	6.1	39.2	8.9	25.9	4.5
1995 .....	42.5	9.8	26.9	5.8	37.1	8.3	24.6	4.2
1997 .....	44.9	9.8	28.3	6.8	37.7	7.6	25.3	4.8
1999 .....	46.2	11.1	28.0	7.2	39.2	9.2	24.9	5.1

See explanatory notes, and SOURCE, if any, at end of table

Appendix table 5-32.

**Academic doctoral scientists and engineers, by primary work activity: 1973–99**  
 (Thousands)

Year	Total employment				Full-time faculty			
	Total	Research	Teaching	Other	Total	Research	Teaching	Other
<b>Engineering</b>								
1973 .....	12.4	2.1	8.4	1.7	11.3	1.5	8.1	1.5
1975 .....	13.4	2.3	8.9	2.0	12.2	1.7	8.7	1.6
1977 .....	14.8	2.9	8.7	2.9	13.5	2.3	8.5	2.6
1979 .....	15.8	3.4	9.1	3.3	14.3	2.6	8.9	2.8
1981 .....	16.1	3.3	10.1	2.7	14.7	2.7	10.0	1.9
1983 .....	18.1	3.9	10.8	3.4	16.4	3.0	10.4	2.9
1985 .....	19.9	4.4	11.7	3.5	17.9	3.7	11.2	2.6
1987 .....	21.2	6.2	11.3	3.7	19.3	5.0	11.0	3.2
1989 .....	22.8	6.9	12.2	3.7	20.2	5.4	11.7	3.1
1991 .....	22.8	7.2	12.2	3.3	20.1	5.5	11.8	2.7
1993 .....	23.1	7.9	11.6	3.7	20.1	6.0	11.0	3.1
1995 .....	23.8	8.7	12.1	3.0	20.0	6.3	11.5	2.2
1997 .....	26.6	10.1	12.6	3.8	21.5	6.7	12.0	2.8
1999 .....	25.5	9.4	12.1	4.0	21.1	6.7	11.7	2.7

NA = not available

NOTES: Data exclude scientists and engineers with doctorates from foreign institutions. Field refers to field of degree.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients, unpublished tabulations.

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*Science & Engineering Indicators – 2002*

Appendix table 5-33.

**Academic doctoral scientists and engineers whose primary or secondary work activity is teaching or research: 1973–99**  
 (Thousands)

Field of degree	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999
<b>Total employment</b>														
<b>Teaching is primary or secondary work activity</b>														
Total S&E.....	94.9	110.4	110.8	115.2	125.2	131.3	138.5	151.4	155.8	160.8	145.2	147.1	153.5	158.7
Physical sciences .....	17.5	18.9	18.6	18.4	18.9	18.6	19.6	20.9	20.4	20.9	18.5	19.2	18.8	20.2
Mathematics .....	8.8	10.3	10.6	10.9	11.0	11.5	12.2	12.8	13.3	14.0	13.5	12.8	13.3	13.3
Computer science.....	0.0	0.0	0.0	0.1	0.3	0.4	0.6	0.8	1.3	1.8	2.0	2.5	2.6	2.9
Earth, atmospheric, and ocean sciences ...	2.7	3.2	3.2	3.1	3.5	3.8	3.8	4.3	4.5	4.7	4.1	4.3	4.6	5.0
Life sciences .....	25.3	29.6	28.3	29.8	32.9	34.6	35.0	40.5	41.4	43.3	36.5	38.6	41.6	43.6
Psychology .....	9.8	12.3	12.4	13.2	15.0	15.3	16.5	18.2	18.6	18.8	17.3	17.8	18.0	19.0
Social sciences .....	20.2	24.7	25.9	27.6	31.0	32.8	35.2	36.7	37.6	39.0	36.5	35.2	36.6	37.2
Engineering .....	10.5	11.4	11.7	12.1	12.7	14.3	15.6	17.2	18.6	18.3	16.8	16.8	18.0	17.5
<b>Research is primary or secondary work activity</b>														
Total S&E.....	82.3	90.6	85.0	90.0	100.7	104.7	115.2	144.0	151.6	156.6	150.1	153.5	164.7	168.1
Physical sciences .....	16.3	16.9	16.3	15.4	16.3	16.1	17.7	20.3	20.8	20.8	20.0	20.6	21.8	21.6
Mathematics .....	6.8	7.5	6.8	6.9	6.8	7.2	7.6	9.7	10.2	10.7	9.5	9.4	10.1	9.9
Computer science.....	0.0	0.0	0.0	0.1	0.3	0.4	0.6	1.0	1.3	1.7	2.0	2.4	2.4	2.6
Earth, atmospheric, and ocean sciences ...	2.5	2.8	2.9	2.7	3.2	3.3	3.7	4.6	4.9	5.1	5.0	5.1	5.6	5.7
Life sciences .....	26.0	29.0	28.7	32.1	37.1	38.3	41.4	48.8	51.8	53.3	51.8	53.8	57.9	60.8
Psychology .....	7.3	8.5	7.7	8.3	9.9	10.5	10.7	14.3	14.3	15.7	14.9	15.6	16.1	17.2
Social sciences .....	14.3	16.9	13.8	14.7	17.6	17.8	20.9	28.5	30.5	31.1	29.3	28.1	29.8	30.9
Engineering .....	9.0	9.0	8.9	9.8	9.5	11.2	12.5	16.8	17.6	18.2	17.5	18.5	20.9	19.4
<b>Full-time faculty</b>														
<b>Teaching is primary or secondary work activity</b>														
Total S&E.....	88.6	103.4	104.7	107.9	117.7	122.3	127.9	141.0	143.6	148.1	134.0	134.0	138.1	143.1
Physical sciences .....	15.9	17.4	17.3	17.2	17.6	17.3	18.1	19.5	18.9	19.2	17.0	17.2	17.2	18.2
Mathematics .....	8.5	9.9	10.1	10.5	10.6	11.1	11.7	12.3	12.7	13.3	13.1	11.8	12.0	11.8
Computer science.....	0.0	0.0	0.0	0.1	0.3	0.3	0.6	0.8	1.3	1.7	1.9	2.4	2.4	2.9
Earth, atmospheric, and ocean sciences ...	2.6	3.1	3.1	3.0	3.3	3.6	3.7	4.0	4.2	4.2	3.6	3.9	4.1	4.5
Life sciences .....	23.2	27.3	26.4	27.5	30.6	31.6	31.9	36.9	37.3	38.7	32.8	34.4	36.4	38.5
Psychology .....	9.1	11.4	11.6	12.0	13.7	14.1	15.1	16.7	16.9	17.5	15.4	16.0	16.1	16.9
Social sciences .....	19.1	23.3	24.7	26.1	29.5	30.6	32.1	34.3	34.7	36.0	34.1	32.3	32.9	33.5
Engineering .....	10.1	10.9	11.4	11.5	12.2	13.7	14.8	16.5	17.6	17.5	16.1	16.0	16.9	16.8
<b>Research is primary or secondary work activity</b>														
Total S&E.....	72.0	78.9	71.6	74.1	83.8	86.9	95.1	121.4	125.8	131.4	121.7	121.7	127.0	129.2
Physical sciences .....	13.0	13.4	12.4	11.7	12.5	12.5	13.4	16.1	16.0	16.4	14.4	14.2	14.9	14.7
Mathematics .....	6.6	7.1	6.4	6.4	6.5	6.9	7.3	9.1	9.8	10.2	9.1	8.4	8.9	8.5
Computer science.....	0.0	0.0	0.0	0.0	0.2	0.3	0.5	0.8	1.2	1.6	1.8	2.2	2.2	2.4
Earth, atmospheric, and ocean sciences ...	2.1	2.5	2.5	2.2	2.6	2.6	2.9	3.6	4.0	3.8	3.6	3.7	3.9	4.0
Life sciences .....	21.8	24.1	22.9	24.7	28.7	29.6	31.9	38.3	39.0	41.0	38.4	39.5	41.2	42.5
Psychology .....	6.6	7.5	6.7	6.6	8.0	8.8	9.0	12.1	12.2	13.9	12.6	12.9	13.3	13.9
Social sciences .....	13.6	15.9	12.9	13.5	16.5	16.0	18.8	26.1	27.9	28.3	26.6	25.3	25.8	27.2
Engineering .....	8.2	8.3	8.0	8.9	8.8	10.2	11.4	15.2	15.7	16.2	15.1	15.5	16.7	15.9

NOTES: Data excludes scientists and engineers with foreign-earned doctorates. Faculty includes full, associate, and assistant professors and instructors.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients.

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Appendix table 5-34.

**Estimates of number of academic doctoral researchers and graduate research assistants, by field of degree or study: 1973–99**

Year	Total S&E	Physical sciences	Mathematics	Computer science	Earth, atmospheric, and ocean sciences	Life sciences	Psychology	Social sciences	Engineering
<b>Academic doctoral researchers plus graduate research assistants</b>									
1973 .....	118.2	22.6	7.5	0.7	5.1	35.5	9.2	18.3	19.4
1975 .....	130.6	23.3	8.1	0.7	5.6	40.3	10.7	21.7	20.0
1977 .....	128.7	23.1	7.6	0.7	6.1	41.8	10.0	18.7	20.7
1979 .....	139.0	23.2	7.7	0.9	6.3	47.5	10.8	19.9	22.6
1981 .....	153.4	24.9	7.6	1.4	6.7	53.4	12.8	22.8	23.9
1983 .....	159.6	25.2	8.0	1.8	6.8	54.8	13.5	22.8	26.7
1985 .....	176.2	28.0	8.6	2.7	7.4	59.3	13.8	26.0	30.4
1987 .....	214.2	31.9	10.8	3.8	8.2	69.0	17.5	34.0	39.0
1989 .....	230.7	33.2	11.5	4.6	9.1	75.0	18.1	36.7	42.2
1991 .....	241.8	33.0	12.1	5.3	9.5	79.1	19.9	37.9	45.0
1993 .....	240.3	32.3	10.9	5.8	9.7	79.8	19.5	36.7	45.4
1995 .....	243.4	32.4	10.9	6.3	9.8	83.1	20.2	35.3	45.5
1997 .....	252.7	33.1	11.5	6.4	9.9	86.5	20.9	36.5	47.8
1999 .....	259.4	32.9	11.2	7.5	10.0	89.8	22.0	38.1	48.1
<b>Academic doctoral researchers</b>									
1973 .....	82.3	16.3	6.8	0.0	2.5	26.0	7.3	14.3	9.0
1975 .....	90.6	16.9	7.5	0.0	2.8	29.0	8.5	16.9	9.0
1977 .....	85.0	16.3	6.8	0.0	2.9	28.7	7.7	13.8	8.9
1979 .....	90.0	15.4	6.9	0.1	2.7	32.1	8.3	14.7	9.8
1981 .....	100.7	16.3	6.8	0.3	3.2	37.1	9.9	17.6	9.5
1983 .....	104.7	16.1	7.2	0.4	3.3	38.3	10.5	17.8	11.2
1985 .....	115.2	17.7	7.6	0.6	3.7	41.4	10.7	20.9	12.5
1987 .....	144.0	20.3	9.7	1.0	4.6	48.8	14.3	28.5	16.8
1989 .....	151.6	20.8	10.2	1.3	4.9	51.8	14.3	30.5	17.6
1991 .....	156.6	20.8	10.7	1.7	5.1	53.3	15.7	31.1	18.2
1993 .....	150.1	20.0	9.5	2.0	5.0	51.8	14.9	29.3	17.5
1995 .....	153.5	20.6	9.4	2.4	5.1	53.8	15.6	28.1	18.5
1997 .....	164.7	21.8	10.1	2.4	5.6	57.9	16.1	29.8	20.9
1999 .....	168.1	21.6	9.9	2.6	5.7	60.8	17.2	30.9	19.4
<b>Graduate research assistants</b>									
1973 .....	35.9	6.3	0.7	0.7	2.6	9.5	1.9	4.0	10.4
1975 .....	40.0	6.4	0.6	0.7	2.8	11.3	2.2	4.8	11.0
1977 .....	43.7	6.8	0.8	0.7	3.2	13.1	2.3	4.9	11.8
1979 .....	49.0	7.8	0.8	0.8	3.6	15.4	2.5	5.2	12.8
1981 .....	52.7	8.6	0.8	1.1	3.5	16.3	2.9	5.2	14.4
1983 .....	54.9	9.1	0.8	1.4	3.5	16.5	3.0	5.0	15.5
1985 .....	61.0	10.3	1.0	2.1	3.7	17.9	3.1	5.1	17.9
1987 .....	70.2	11.6	1.1	2.8	3.6	20.2	3.2	5.5	22.2
1989 .....	79.1	12.4	1.3	3.3	4.2	23.2	3.8	6.2	24.6
1991 .....	85.2	12.2	1.4	3.6	4.4	25.8	4.2	6.8	26.8
1993 .....	90.2	12.3	1.4	3.8	4.7	28.0	4.6	7.4	27.9
1995 .....	89.9	11.8	1.5	3.9	4.7	29.3	4.6	7.2	27.0
1997 .....	88.0	11.3	1.4	4.0	4.3	28.6	4.8	6.7	26.9
1999 .....	91.3	11.3	1.3	4.9	4.3	29.0	4.8	7.2	28.7

NOTE: Graduate research assistants are full-time graduate students with research assistantships as their primary mechanism of support. Academic doctoral researchers are headcounts of those with research as primary or secondary work activity. Foreign-earned doctorates are excluded.

SOURCES: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients and Survey of Graduate Students and Postdoctorates in Science and Engineering.

*Science & Engineering Indicators – 2002*

See figure 5-29.

Appendix table 5-35.

**Estimates of total academic employment, doctoral researchers and graduate research assistants, by Carnegie institution type: 1973–99**

Year	Total employment		Researcher headcount		Research is primary		Graduate research assistant	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<b>All universities and colleges</b>								
1973 .....	118.0	100	82.3	100	27.8	100	35.9	100
1975 .....	134.1	100	90.6	100	30.8	100	40.0	100
1977 .....	145.4	100	85.0	100	37.0	100	43.7	100
1979 .....	155.3	100	90.0	100	41.3	100	49.0	100
1981 .....	167.1	100	100.7	100	46.5	100	52.7	100
1983 .....	176.1	100	104.7	100	48.9	100	54.9	100
1985 .....	190.2	100	115.2	100	55.9	100	61.0	100
1987 .....	195.9	100	144.0	100	66.5	100	70.2	100
1989 .....	206.6	100	151.6	100	72.2	100	79.1	100
1991 .....	210.6	100	156.6	100	73.9	100	85.2	100
1993 .....	213.8	100	150.1	100	80.2	100	90.2	100
1995 .....	217.5	100	153.5	100	83.0	100	89.9	100
1997 .....	232.5	100	164.7	100	88.6	100	88.0	100
1999 .....	240.2	100	168.1	100	91.4	100	91.3	100
<b>Research universities</b>								
1973 .....	65.2	57.9	52.5	65.5	22.9	84.9	32.3	89.9
1975 .....	73.4	57.0	58.0	65.2	25.5	83.8	35.6	89.0
1977 .....	78.2	56.8	55.9	67.6	29.5	81.6	38.8	89.0
1979 .....	83.5	57.7	59.0	68.5	32.1	80.5	42.6	86.9
1981 .....	91.0	57.0	66.6	67.4	37.5	81.9	45.2	85.8
1983 .....	89.9	55.9	66.3	67.1	37.4	81.6	47.1	85.8
1985 .....	102.8	56.5	75.1	66.3	45.4	82.2	52.2	85.6
1987 .....	106.9	56.6	90.0	63.7	53.7	81.6	59.9	85.3
1989 .....	112.5	56.4	94.7	63.5	58.1	81.2	66.5	84.1
1991 .....	111.6	55.4	93.8	61.3	57.9	79.3	70.1	82.3
1993 .....	112.9	55.5	91.1	62.4	60.6	77.0	73.9	81.9
1995 .....	112.8	54.7	92.0	61.7	62.4	76.8	73.1	81.3
1997 .....	113.6	54.5	92.3	60.8	60.6	75.4	70.6	80.2
1999 .....	117.2	53.9	95.5	60.9	64.3	75.8	73.1	80.0
<b>Doctorate-granting institutions</b>								
1973 .....	14.0	12.4	9.9	12.3	1.7	6.4	3.1	8.6
1975 .....	15.9	12.3	10.6	11.9	1.8	5.8	3.7	9.3
1977 .....	17.2	12.5	9.4	11.4	2.4	6.6	4.0	9.2
1979 .....	17.2	11.9	9.2	10.6	2.6	6.4	4.4	9.1
1981 .....	18.8	11.8	10.5	10.6	2.6	5.6	5.0	9.5
1983 .....	19.5	12.2	10.7	10.8	2.8	6.0	5.3	9.6
1985 .....	21.2	11.6	12.4	11.0	3.5	6.3	5.8	9.5
1987 .....	22.2	11.8	16.2	11.5	4.4	6.7	6.7	9.6
1989 .....	23.5	11.8	16.8	11.3	4.9	6.9	7.9	10.0
1991 .....	24.9	12.3	18.4	12.1	5.9	8.0	9.2	10.8
1993 .....	24.2	11.9	17.4	11.9	6.7	8.4	9.9	11.0
1995 .....	25.0	12.1	17.7	11.9	7.2	8.8	9.9	11.0
1997 .....	25.8	12.4	19.1	12.6	8.2	10.2	10.3	11.7
1999 .....	26.3	12.1	19.3	12.3	8.2	9.7	10.7	11.7
<b>Comprehensive institutions</b>								
1973 .....	20.8	18.5	10.7	13.4	0.6	2.2	0.1	0.3
1975 .....	24.3	18.8	12.1	13.7	0.7	2.4	0.3	0.6
1977 .....	25.9	18.8	10.0	12.1	1.2	3.3	0.3	0.7
1979 .....	26.2	18.1	10.0	11.6	1.5	3.8	1.3	2.6
1981 .....	29.9	18.8	11.7	11.9	1.2	2.6	1.6	3.0
1983 .....	30.9	19.3	12.5	12.7	1.3	2.9	1.8	3.3
1985 .....	34.9	19.2	14.1	12.5	1.5	2.7	1.1	1.8
1987 .....	35.3	18.7	19.7	14.0	1.8	2.7	1.3	1.9
1989 .....	37.4	18.8	21.1	14.1	2.4	3.3	2.7	3.4
1991 .....	38.7	19.2	23.7	15.5	2.8	3.8	3.5	4.1
1993 .....	38.4	18.9	20.9	14.3	3.9	5.0	3.7	4.1
1995 .....	40.5	19.7	22.5	15.1	4.1	5.1	4.2	4.7
1997 .....	41.2	19.8	23.2	15.3	4.5	5.5	4.2	4.8
1999 .....	42.6	19.6	22.9	14.6	3.7	4.3	4.6	5.0

See explanatory notes, if any, and SOURCE at end of table

Appendix table 5-35.

**Estimates of total academic employment, doctoral researchers and graduate research assistants, by Carnegie institution type: 1973–99**

Year	Total employment		Researcher headcount		Research is primary		Graduate research assistant	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<b>Free-standing medical institutions</b>								
1973 .....	3.3	2.9	2.6	3.2	1.5	5.5	0.3	0.7
1975 .....	4.3	3.4	3.2	3.6	2.1	6.9	0.3	0.6
1977 .....	4.9	3.6	3.5	4.2	2.5	6.9	0.3	0.7
1979 .....	5.9	4.1	4.2	4.8	3.1	7.7	0.4	0.9
1981 .....	7.2	4.5	5.3	5.3	4.1	9.0	0.5	0.9
1983 .....	7.0	4.4	5.1	5.1	3.9	8.6	0.5	0.9
1985 .....	8.3	4.6	5.9	5.2	4.5	8.1	0.7	1.2
1987 .....	9.0	4.8	7.2	5.1	5.3	8.0	1.1	1.6
1989 .....	9.7	4.9	7.6	5.1	5.6	7.9	1.6	2.0
1991 .....	9.6	4.8	7.8	5.1	6.0	8.3	1.9	2.2
1993 .....	10.8	5.3	8.2	5.6	6.4	8.2	2.2	2.4
1995 .....	11.2	5.4	8.4	5.6	6.7	8.2	2.4	2.6
1997 .....	9.8	4.7	7.4	4.8	5.9	7.3	2.5	2.8
1999 .....	11.9	5.5	9.2	5.9	7.5	8.9	2.6	2.8
<b>All others</b>								
1973 .....	9.3	8.2	4.5	5.6	0.3	1.0	0.2	0.5
1975 .....	10.9	8.5	5.0	5.6	0.3	1.1	0.2	0.4
1977 .....	11.4	8.3	3.9	4.7	0.6	1.6	0.2	0.5
1979 .....	12.0	8.3	3.9	4.5	0.6	1.5	0.2	0.5
1981 .....	12.6	7.9	4.7	4.8	0.4	1.0	0.4	0.8
1983 .....	13.3	8.3	4.3	4.4	0.4	0.9	0.3	0.6
1985 .....	14.7	8.1	5.7	5.0	0.4	0.7	1.1	1.9
1987 .....	15.4	8.1	8.1	5.7	0.6	1.0	1.2	1.7
1989 .....	16.2	8.1	9.0	6.1	0.6	0.8	0.3	0.4
1991 .....	16.6	8.2	9.3	6.1	0.4	0.6	0.5	0.6
1993 .....	17.1	8.4	8.6	5.9	1.2	1.5	0.6	0.6
1995 .....	16.7	8.1	8.5	5.7	0.9	1.1	0.4	0.5
1997 .....	18.0	8.7	9.7	6.4	1.3	1.6	0.4	0.4
1999 .....	19.6	9.0	9.8	6.2	1.1	1.3	0.4	0.5

NOTES: Numbers are in thousands. Headcounts are the sum of respondents for whom research is either the primary or secondary work activity. Foreign-earned doctorates are excluded. Graduate research assistants are full-time graduate students with primary research assistantship support. Carnegie type is based on 1994 typology. Details do not add to totals because of omission of those with unknown Carnegie type.

SOURCES: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients and Survey of Graduate Students and Postdoctorates in Science and Engineering.

See text table 5-12 in Volume I.

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Appendix table 5-36.

**Estimates of academic doctoral researchers by type of position**

Year	Employment		Researcher headcount		Research is primary	
	Number	Percent	Number	Percent	Number	Percent
<b>Total employment</b>						
1973 .....	118.0	100.0	82.3	100.0	27.8	100.0
1975 .....	134.1	100.0	90.6	100.0	30.8	100.0
1977 .....	145.4	100.0	85.0	100.0	37.0	100.0
1979 .....	155.3	100.0	90.0	100.0	41.3	100.0
1981 .....	167.1	100.0	100.7	100.0	46.5	100.0
1983 .....	176.1	100.0	104.7	100.0	48.9	100.0
1985 .....	190.2	100.0	115.2	100.0	55.9	100.0
1987 .....	195.9	100.0	144.0	100.0	66.5	100.0
1989 .....	206.6	100.0	151.6	100.0	72.2	100.0
1991 .....	210.6	100.0	156.6	100.0	73.9	100.0
1993 .....	213.8	100.0	150.1	100.0	80.2	100.0
1995 .....	217.5	100.0	153.5	100.0	83.0	100.0
1997 .....	232.5	100.0	164.7	100.0	88.6	100.0
1999 .....	240.2	100.0	168.1	100.0	91.4	100.0
<b>Full-time faculty</b>						
1973 .....	103.3	87.6	72.0	87.5	19.8	71.3
1975 .....	116.4	86.8	78.9	87.1	21.4	69.3
1977 .....	125.6	86.4	71.6	84.3	25.8	69.8
1979 .....	131.2	84.5	74.1	82.3	28.1	68.0
1981 .....	141.9	85.0	83.8	83.2	31.8	68.5
1983 .....	148.4	84.3	86.9	83.0	33.6	68.8
1985 .....	156.9	82.5	95.1	82.6	39.5	70.6
1987 .....	164.4	83.9	121.4	84.3	48.6	73.0
1989 .....	169.8	82.2	125.8	83.0	51.6	71.5
1991 .....	173.1	82.2	131.4	84.0	53.8	72.8
1993 .....	172.4	80.7	121.7	81.1	56.9	70.9
1995 .....	171.4	78.8	121.7	79.2	56.6	68.1
1997 .....	178.4	76.7	127.0	77.1	58.0	65.5
1999 .....	184.0	76.6	129.2	76.8	60.4	66.1
<b>Postdoctorates</b>						
1973 .....	4.2	3.5	4.0	4.9	3.8	13.8
1975 .....	6.2	4.6	5.9	6.5	5.7	18.4
1977 .....	7.6	5.2	7.1	8.4	6.8	18.4
1979 .....	8.1	5.2	7.4	8.2	6.9	16.8
1981 .....	8.5	5.1	8.0	8.0	7.7	16.6
1983 .....	8.3	4.7	7.4	7.1	7.1	14.6
1985 .....	8.7	4.6	7.8	6.8	7.5	13.4
1987 .....	9.3	4.8	8.9	6.2	8.4	12.6
1989 .....	11.5	5.6	10.8	7.1	10.3	14.2
1991 .....	9.9	4.7	9.4	6.0	9.2	12.4
1993 .....	13.3	6.2	13.3	8.9	12.7	15.8
1995 .....	16.8	7.7	16.1	10.5	15.1	18.2
1997 .....	18.9	8.1	18.0	10.9	16.7	18.9
1999 .....	18.5	7.7	17.9	10.6	16.6	18.2
<b>Other</b>						
1973 .....	10.5	6.4	4.6	5.6	3.2	11.3
1975 .....	11.5	5.8	4.3	4.7	2.9	9.3
1977 .....	12.2	5.5	4.6	5.4	3.2	8.7
1979 .....	15.9	9.4	7.9	8.8	5.8	14.1
1981 .....	16.6	9.4	8.4	8.4	6.7	14.3
1983 .....	19.4	9.2	9.0	8.6	7.1	14.4
1985 .....	24.6	12.0	11.5	10.0	8.5	15.2
1987 .....	22.1	10.6	12.9	9.0	9.0	13.6
1989 .....	25.4	11.4	14.0	9.3	9.7	13.5
1991 .....	27.6	11.3	13.7	8.8	9.6	13.1
1993 .....	28.1	13.1	15.1	10.0	10.7	13.3
1995 .....	29.4	13.5	15.7	10.2	11.4	13.7
1997 .....	35.3	15.2	19.8	12.0	13.8	15.6
1999 .....	37.5	15.6	21.0	12.5	14.3	15.7

NOTE: Headcounts are the sum of respondents for whom research is either the primary or secondary work activity. Foreign-earned doctorates are excluded.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients.

Appendix table 5-37.

**Estimates of academic doctoral researchers and graduate research assistants by field: 1973–99**

Year	Employment		Researcher headcount		Research is primary activity		Graduate research assistants	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<b>S&amp;E total</b>								
1973 .....	118.0	100	82.3	100	27.8	100	35.9	100
1975 .....	134.1	100	90.6	100	30.8	100	40.0	100
1977 .....	145.4	100	85.0	100	37.0	100	43.7	100
1979 .....	155.3	100	90.0	100	41.3	100	49.0	100
1981 .....	167.1	100	100.7	100	46.5	100	52.7	100
1983 .....	176.1	100	104.7	100	48.9	100	54.9	100
1985 .....	190.2	100	115.2	100	55.9	100	61.0	100
1987 .....	195.9	100	144.0	100	66.5	100	70.2	100
1989 .....	206.6	100	151.6	100	72.2	100	79.1	100
1991 .....	210.6	100	156.6	100	73.9	100	85.2	100
1993 .....	213.8	100	150.1	100	80.2	100	90.2	100
1995 .....	217.5	100	153.5	100	83.0	100	89.9	100
1997 .....	232.5	100	164.7	100	88.6	100	88.0	100
1999 .....	240.2	100	168.1	100	91.4	100	91.3	100
<b>Physical sciences</b>								
1973 .....	22.1	18.7	16.3	19.8	5.9	21.3	6.3	17.5
1975 .....	23.6	17.6	16.9	18.7	6.4	20.8	6.4	16.1
1977 .....	25.0	17.2	16.3	19.2	7.9	21.3	6.8	15.6
1979 .....	24.6	15.9	15.4	17.1	7.5	18.3	7.8	15.9
1981 .....	25.3	15.2	16.3	16.2	8.0	17.1	8.6	16.3
1983 .....	25.1	14.3	16.1	15.3	7.7	15.9	9.1	16.7
1985 .....	27.0	14.2	17.7	15.4	9.4	16.8	10.3	16.9
1987 .....	27.2	13.9	20.3	14.1	10.2	15.3	11.6	16.5
1989 .....	27.7	13.4	20.8	13.7	10.9	15.1	12.4	15.7
1991 .....	27.7	13.1	20.8	13.3	10.6	14.4	12.2	14.4
1993 .....	28.6	13.4	20.0	13.3	12.0	15.0	12.3	13.6
1995 .....	29.4	13.5	20.6	13.4	12.6	15.2	11.8	13.1
1997 .....	30.2	13.0	21.8	13.2	12.7	14.4	11.3	12.8
1999 .....	30.9	12.9	21.6	12.8	12.2	13.3	11.3	12.3
<b>Mathematics</b>								
1973 .....	9.7	8.2	6.8	8.3	1.5	5.4	0.7	1.9
1975 .....	11.0	8.2	7.5	8.2	1.5	4.7	0.6	1.6
1977 .....	11.7	8.0	6.8	8.0	1.8	4.9	0.8	1.8
1979 .....	12.2	7.9	6.9	7.7	2.1	5.0	0.8	1.7
1981 .....	12.4	7.4	6.8	6.8	1.9	4.2	0.8	1.4
1983 .....	12.9	7.3	7.2	6.6	2.0	4.0	0.8	1.5
1985 .....	13.6	7.1	7.6	6.6	2.7	4.8	1.0	1.6
1987 .....	13.8	7.1	9.7	6.7	3.2	4.7	1.1	1.6
1989 .....	14.5	7.0	10.2	6.8	3.5	4.8	1.3	1.6
1991 .....	15.2	7.2	10.7	6.9	3.5	4.8	1.4	1.6
1993 .....	15.5	7.2	9.5	6.3	3.4	4.2	1.4	1.6
1995 .....	14.6	6.7	9.4	6.1	3.3	3.9	1.5	1.6
1997 .....	15.6	6.7	10.1	6.2	3.5	4.0	1.4	1.6
1999 .....	15.2	6.3	9.9	5.9	2.9	3.2	1.3	1.4
<b>Computer sciences</b>								
1973 .....	NA	NA	NA	NA	NA	NA	0.7	1.8
1975 .....	NA	NA	NA	NA	NA	NA	0.7	1.9
1977 .....	NA	NA	NA	NA	NA	NA	0.7	1.7
1979 .....	0.1	0.1	0.1	0.1	0.0	0.1	0.8	1.7
1981 .....	0.3	0.2	0.3	0.3	0.1	0.2	1.1	2.1
1983 .....	0.5	0.3	0.4	0.3	0.2	0.4	1.4	2.5
1985 .....	0.8	0.4	0.6	0.5	0.4	0.7	2.1	3.4
1987 .....	1.1	0.5	1.0	0.7	0.7	1.0	2.8	4.0
1989 .....	1.5	0.7	1.3	0.9	0.8	1.1	3.3	4.2
1991 .....	2.0	0.9	1.7	1.1	1.1	1.4	3.6	4.2
1993 .....	2.5	1.2	2.0	1.3	0.9	1.1	3.8	4.2
1995 .....	3.1	1.4	2.4	1.6	1.0	1.3	3.9	4.4
1997 .....	3.3	1.4	2.4	1.5	1.1	1.2	4.0	4.6
1999 .....	3.7	1.5	2.6	1.6	1.1	1.2	4.9	5.4

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-37.

**Estimates of academic doctoral researchers and graduate research assistants by field: 1973–99**

Year	Employment		Researcher headcount		Research is primary activity		Graduate research assistants	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<b>Earth, atmospheric, and ocean sciences</b>								
1973 .....	3.4	2.9	2.5	3.0	0.7	2.5	2.6	7.1
1975 .....	3.9	2.9	2.8	3.1	0.8	2.7	2.8	7.1
1977 .....	4.2	2.9	2.9	3.4	1.0	2.7	3.2	7.4
1979 .....	4.2	2.7	2.7	3.0	1.0	2.4	3.6	7.3
1981 .....	4.6	2.7	3.2	3.2	1.4	2.9	3.5	6.6
1983 .....	4.8	2.7	3.3	3.1	1.5	3.0	3.5	6.4
1985 .....	5.2	2.8	3.7	3.2	1.6	2.9	3.7	6.1
1987 .....	5.6	2.8	4.6	3.2	2.1	3.2	3.6	5.2
1989 .....	5.9	2.8	4.9	3.2	2.4	3.3	4.2	5.2
1991 .....	6.0	2.9	5.1	3.3	2.5	3.4	4.4	5.2
1993 .....	6.4	3.0	5.0	3.3	2.7	3.4	4.7	5.2
1995 .....	6.4	3.0	5.1	3.3	2.6	3.1	4.7	5.2
1997 .....	7.3	3.2	5.6	3.4	2.9	3.2	4.3	4.9
1999 .....	7.8	3.2	5.6	3.4	2.9	3.2	4.3	4.7
<b>Life sciences</b>								
1973 .....	34.9	29.5	26.0	31.6	12.8	46.0	9.5	26.3
1975 .....	39.4	29.4	29.0	32.0	14.5	47.0	11.3	28.3
1977 .....	42.6	29.3	28.7	33.7	16.6	44.7	13.1	30.0
1979 .....	47.0	30.3	32.1	35.6	19.7	47.6	15.4	31.5
1981 .....	51.3	30.7	37.1	36.8	23.2	49.9	16.3	31.0
1983 .....	54.8	31.1	38.3	36.6	24.3	49.7	16.5	30.0
1985 .....	58.7	30.8	41.4	35.9	27.1	48.4	17.9	29.3
1987 .....	61.2	31.3	48.8	33.9	31.5	47.3	20.2	28.8
1989 .....	64.8	31.3	51.8	34.1	33.8	46.7	23.2	29.3
1991 .....	66.9	31.8	53.3	34.1	34.5	46.7	25.8	30.3
1993 .....	68.2	31.9	51.8	34.5	36.0	44.9	28.0	31.1
1995 .....	71.6	32.9	53.8	35.1	37.7	45.3	29.3	32.5
1997 .....	77.3	33.2	57.9	35.2	40.5	45.7	28.6	32.5
1999 .....	81.9	34.1	60.8	36.2	43.2	47.2	29.0	31.7
<b>Psychology</b>								
1973 .....	12.2	10.4	7.3	8.9	2.0	7.3	1.9	5.4
1975 .....	14.8	11.0	8.5	9.4	2.2	7.1	2.2	5.5
1977 .....	16.2	11.1	7.7	9.1	2.8	7.5	2.3	5.3
1979 .....	17.7	11.4	8.3	9.2	3.4	8.3	2.5	5.2
1981 .....	20.1	12.0	9.9	9.8	4.1	8.8	2.9	5.5
1983 .....	21.0	11.9	10.5	10.0	4.4	8.9	3.0	5.4
1985 .....	23.1	12.1	10.7	9.3	4.6	8.2	3.1	5.0
1987 .....	23.7	12.1	14.3	9.9	5.2	7.8	3.2	4.6
1989 .....	25.0	12.1	14.3	9.5	5.9	8.2	3.8	4.9
1991 .....	25.2	12.0	15.7	10.0	6.2	8.4	4.2	5.0
1993 .....	25.0	11.7	14.9	9.9	6.7	8.3	4.6	5.1
1995 .....	26.1	12.0	15.6	10.1	7.4	8.9	4.6	5.1
1997 .....	27.3	11.7	16.1	9.8	8.0	9.0	4.8	5.4
1999 .....	29.0	12.1	17.2	10.2	8.6	9.5	4.8	5.3
<b>Social sciences</b>								
1973 .....	23.4	19.8	14.3	17.4	2.8	10.2	4.0	11.1
1975 .....	28.0	20.9	16.9	18.6	3.2	10.2	4.8	12
1977 .....	31.1	21.4	13.8	16.2	4.1	11.1	4.9	11.2
1979 .....	33.6	21.6	14.7	16.3	4.2	10.1	5.2	10.6
1981 .....	36.9	22.1	17.6	17.5	4.5	9.7	5.2	9.8
1983 .....	38.8	22.0	17.8	17.0	4.9	10.1	5.0	9.2
1985 .....	41.9	22.0	20.9	18.2	5.7	10.2	5.1	8.3
1987 .....	42.1	21.5	28.5	19.8	7.5	11.3	5.5	7.8
1989 .....	44.5	21.5	30.5	20.1	8.2	11.3	6.2	7.9
1991 .....	44.8	21.3	31.1	19.8	8.4	11.3	6.8	8.0
1993 .....	44.4	20.8	29.3	19.5	10.7	13.4	7.4	8.2
1995 .....	42.5	19.5	28.1	18.3	9.8	11.8	7.2	8.0
1997 .....	44.9	19.3	29.8	18.1	9.8	11.1	6.7	7.7
1999 .....	46.2	19.2	30.9	18.4	11.1	12.1	7.2	7.9

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-37.

**Estimates of academic doctoral researchers and graduate research assistants by field: 1973–99**

Year	Employment		Researcher headcount		Research is primary activity		Graduate research assistants	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<b>Engineering</b>								
1973 .....	12.4	10.5	9.0	11.0	2.1	7.4	10.4	28.9
1975 .....	13.4	10.0	9.0	10.0	2.3	7.5	11.0	27.5
1977 .....	14.8	10.1	8.9	10.5	2.9	7.9	11.8	27.1
1979 .....	15.8	10.2	9.8	10.9	3.4	8.2	12.8	26.2
1981 .....	16.1	9.7	9.5	9.5	3.3	7.2	14.4	27.3
1983 .....	18.1	10.3	11.2	10.7	3.9	7.9	15.5	28.3
1985 .....	19.9	10.5	12.5	10.8	4.4	7.9	17.9	29.4
1987 .....	21.2	10.8	16.8	11.6	6.2	9.3	22.2	31.6
1989 .....	22.8	11.0	17.6	11.6	6.9	9.5	24.6	31.1
1991 .....	22.8	10.8	18.2	11.6	7.2	9.7	26.8	31.4
1993 .....	23.1	10.8	17.5	11.7	7.9	9.8	27.9	31.0
1995 .....	23.8	10.9	18.5	12.1	8.7	10.5	27.0	30.1
1997 .....	26.6	11.4	20.9	12.7	10.1	11.4	26.9	30.6
1999 .....	25.5	10.6	19.4	11.6	9.4	10.3	28.7	31.4

NA = not available

NOTE: Headcounts are the sum of respondents for whom research is either the primary or secondary work activity. Graduate research assistants are full-time students with research assistantships as their primary mechanism of support. Foreign-earned doctorates are excluded.

SOURCES: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients and Survey of Graduate Students and Postdoctorates in Science and Engineering.

See text table 5-12 in Volume 1.

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Appendix table 5-38.

**Academic doctoral scientists and engineers with Federal support, by field of degree: 1973–99**  
 (Percentages)

Year	Total employed	Research is primary activity	Research is secondary activity	Full-time faculty	Full-time other	Post-doctorates
<b>S&amp;E total</b>						
1973 .....	46.9	81.5	40.4	44.3	70.5	90.3
1975 .....	42.2	79.0	35.6	39.6	58.8	86.3
1977 .....	41.6	75.4	37.5	38.2	68.1	86.0
1979 .....	39.9	75.2	35.3	36.2	58.3	82.1
1981 .....	42.8	80.6	35.3	38.8	58.5	86.3
1983 .....	44.3	79.9	40.5	41.7	59.4	82.2
1985 .....	37.4	73.5	28.9	34.3	49.8	78.5
1987 .....	48.2	79.9	38.7	45.6	60.6	82.1
1989 .....	49.4	79.8	40.7	46.6	60.9	83.5
1991 .....	50.3	80.7	40.0	48.0	58.8	84.5
1993 .....	36.7	67.2	23.9	32.9	42.5	83.1
1995 .....	39.4	69.1	27.5	35.7	43.1	80.1
1997 .....	38.6	66.9	26.4	34.7	47.0	74.1
1999 .....	46.1	73.9	36.6	43.1	49.9	80.3
<b>Physical sciences</b>						
1973 .....	50.1	86.3	43.5	44.4	75.4	92.4
1975 .....	45.2	82.4	39.4	39.3	64.1	90.2
1977 .....	46.2	79.2	39.2	39.9	75.9	89.4
1979 .....	44.1	79.4	37.7	38.2	72.4	81.9
1981 .....	50.4	88.9	42.5	44.6	70.3	90.2
1983 .....	50.9	84.7	49.3	46.5	72.1	87.3
1985 .....	43.2	79.5	34.4	37.4	66.1	84.4
1987 .....	54.6	86.2	48.9	49.9	72.6	90.5
1989 .....	58.2	87.3	52.6	53.5	72.1	86.8
1991 .....	56.6	88.3	49.5	52.9	72.0	87.6
1993 .....	45.5	75.3	35.4	37.7	61.1	87.1
1995 .....	48.2	77.4	38.3	41.6	52.8	84.6
1997 .....	46.3	75.6	34.8	39.2	63.8	80.4
1999 .....	55.7	83.0	53.1	50.4	68.8	82.5
<b>Mathematics</b>						
1973 .....	28.8	56.6	28.8	28.7	47.2	48.8
1975 .....	19.1	50.1	18.2	18.8	33.5	35.8
1977 .....	19.0	42.3	20.4	18.0	46.9	55.1
1979 .....	21.7	44.0	20.8	20.4	54.6	43.2
1981 .....	21.3	52.7	21.6	21.0	30.1	56.3
1983 .....	30.1	71.0	32.6	29.9	43.4	66.3
1985 .....	21.5	51.5	19.8	21.4	29.1	48.5
1987 .....	31.1	66.8	23.8	30.4	47.8	34.4
1989 .....	33.5	68.1	28.4	32.8	52.8	53.4
1991 .....	34.5	74.5	26.3	34.0	67.2	80.4
1993 .....	18.8	40.7	16.5	18.3	40.6	—
1995 .....	22.3	45.9	17.0	21.1	34.6	45.3
1997 .....	20.9	48.2	15.5	19.4	43.9	35.6
1999 .....	29.1	60.6	25.4	28.3	38.4	54.7
<b>Computer sciences</b>						
1973 .....	NA	NA	NA	NA	NA	NA
1975 .....	NA	NA	NA	NA	NA	NA
1977 .....	NA	NA	NA	NA	NA	NA
1979 .....	34.8	58.3	23.3	25.0	—	57.1
1981 .....	29.7	19.4	35.8	26.6	25.0	100.0
1983 .....	44.6	84.6	30.1	38.1	67.9	100.0
1985 .....	45.0	57.2	19.7	38.0	80.6	0.0
1987 .....	61.7	66.3	58.7	58.1	79.7	88.2
1989 .....	52.4	74.9	31.4	52.8	47.1	100.0
1991 .....	49.4	71.2	27.7	48.2	67.7	—
1993 .....	39.9	64.7	29.0	37.7	59.1	100.0
1995 .....	43.2	75.8	28.6	40.7	62.9	78.0
1997 .....	41.1	59.4	43.3	38.8	63.1	97.2
1999 .....	55.6	85.0	49.5	54.1	74.9	100.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-38.

**Academic doctoral scientists and engineers with Federal support, by field of degree: 1973–99**  
 (Percentages)

Year	Total employed	Research is primary activity	Research is secondary activity	Full-time faculty	Full-time other	Post-doctorates
<b>Earth, atmospheric, and ocean sciences</b>						
1973 .....	47.2	91.3	40.8	44.5	69.7	87.5
1975 .....	46.0	82.0	41.4	43.0	79.9	75.0
1977 .....	42.7	82.0	37.9	37.8	80.3	95.2
1979 .....	45.4	78.4	46.3	40.0	75.2	96.9
1981 .....	50.2	89.0	41.3	45.1	68.6	91.9
1983 .....	54.5	86.3	47.8	50.3	78.9	90.7
1985 .....	51.1	85.7	42.0	44.8	78.4	96.6
1987 .....	60.2	88.4	49.2	54.6	79.5	91.7
1989 .....	63.8	90.4	52.9	60.2	80.9	90.6
1991 .....	66.2	89.9	55.5	61.4	90.7	73.4
1993 .....	51.2	81.9	37.1	45.5	67.9	83.3
1995 .....	54.3	85.7	38.9	48.6	72.0	91.0
1997 .....	58.0	84.2	41.2	52.3	71.0	85.8
1999 .....	63.3	79.8	63.2	61.7	74.5	74.3
<b>Life sciences</b>						
1973 .....	62.2	86.2	51.3	59.8	76.2	92.4
1975 .....	58.9	85.0	47.4	56.4	70.9	87.7
1977 .....	58.1	83.0	50.1	54.9	72.1	88.4
1979 .....	55.3	82.2	44.2	51.4	64.8	84.6
1981 .....	59.6	85.4	45.9	55.6	68.5	86.0
1983 .....	60.0	84.6	51.4	57.8	68.5	82.6
1985 .....	53.5	80.0	39.2	50.5	58.4	78.3
1987 .....	65.3	87.0	50.6	63.4	71.0	82.1
1989 .....	65.1	86.7	50.9	62.1	74.1	86.8
1991 .....	65.5	86.5	50.8	63.7	67.2	84.4
1993 .....	52.2	76.2	34.8	48.6	45.8	84.1
1995 .....	52.5	75.3	36.4	49.0	46.3	81.9
1997 .....	51.0	73.1	34.8	47.6	46.2	77.7
1999 .....	57.9	79.9	45.1	55.1	49.9	82.6
<b>Psychology</b>						
1973 .....	40.0	75.7	37.7	38.8	54.1	89.4
1975 .....	36.1	70.1	34.0	34.1	41.6	86.4
1977 .....	33.2	70.2	29.0	30.6	65.4	82.5
1979 .....	32.6	72.5	24.9	28.3	46.3	86.8
1981 .....	32.7	77.3	23.8	27.5	52.3	92.0
1983 .....	30.1	70.4	26.2	27.3	40.3	84.2
1985 .....	25.9	66.8	22.2	23.6	32.7	70.8
1987 .....	31.2	70.5	23.9	28.3	37.1	88.1
1989 .....	35.5	73.0	29.2	34.0	39.6	66.3
1991 .....	34.7	70.8	27.0	32.9	36.3	95.8
1993 .....	25.7	63.8	15.9	25.2	23.8	71.7
1995 .....	27.6	62.4	19.0	25.1	30.7	71.4
1997 .....	27.4	65.0	16.7	24.9	28.3	71.8
1999 .....	32.9	68.2	24.8	31.5	30.4	71.8
<b>Social sciences</b>						
1973 .....	27.1	64.3	23.1	26.7	48.2	58.5
1975 .....	23.7	61.1	20.3	23.7	31.6	54.6
1977 .....	23.3	51.4	23.4	22.6	35.3	54.7
1979 .....	20.4	53.6	21.5	19.0	37.3	84.9
1981 .....	21.8	53.8	18.6	21.2	32.7	47.9
1983 .....	23.7	55.8	24.3	22.5	34.0	64.6
1985 .....	17.2	44.5	14.9	16.2	26.6	54.7
1987 .....	27.2	50.3	24.9	27.1	36.2	27.4
1989 .....	27.7	49.8	25.8	27.4	33.8	57.6
1991 .....	28.4	51.2	25.4	27.8	32.7	52.5
1993 .....	14.2	33.4	8.3	13.4	22.1	88.1
1995 .....	16.1	37.2	12.2	15.4	22.6	68.5
1997 .....	15.2	30.1	11.6	14.8	22.7	33.9
1999 .....	22.9	44.3	18.0	22.5	29.3	65.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-38.

**Academic doctoral scientists and engineers with Federal support, by field of degree: 1973–99**  
 (Percentages)

Year	Total employed	Research is primary activity	Research is secondary activity	Full-time faculty	Full-time other	Post-doctorates
<b>Engineering</b>						
1973 .....	55.5	81.9	54.2	54.6	83.1	84.7
1975 .....	50.6	81.4	50.5	49.9	67.3	84.3
1977 .....	51.1	78.0	53.7	49.3	86.6	74.7
1979 .....	49.1	72.4	52.8	49.5	53.0	51.1
1981 .....	51.0	80.2	56.8	49.8	60.7	98.9
1983 .....	54.7	83.9	54.4	54.7	63.1	82.7
1985 .....	43.0	74.5	38.0	42.2	44.3	91.4
1987 .....	57.1	82.0	54.8	56.0	76.4	74.8
1989 .....	56.3	78.1	57.1	55.2	71.2	76.0
1991 .....	63.2	86.5	58.9	62.9	66.8	90.0
1993 .....	42.6	69.4	34.3	40.9	59.5	65.7
1995 .....	49.9	74.5	43.1	48.4	56.7	72.7
1997 .....	49.7	70.8	41.0	46.4	67.9	62.1
1999 .....	56.9	75.7	51.0	55.2	64.2	80.4

— = Too few cases; NA = not available

NOTES: 1985 and 1993–97 are not comparable to the other years and underestimate the degree of Federal support by asking whether work performed during the week of April 15 was supported by the Government. In other years, the question pertains to work conducted over the course of a year. Italics are used to highlight noncomparable values. Foreign-earned doctorates are excluded.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients.

See text table 5-14 in Volume 1.

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Appendix table 5-39.

**Recent doctorate holders in academia with Federal support, by field: 1973–99**  
 (Percentages)

Year	One to three years since Ph.D.				Four to seven years since Ph.D.			
	Total employed	Full-time faculty	Other full-time	Postdoc position	Total employed	Full-time faculty	Other full-time	Postdoc position
<b>S&amp;E total</b>								
1973 .....	47.2	35.5	77.8	89.8	47.3	45.0	76.3	93.4
1975 .....	44.2	31.1	58.3	87.8	42.5	40.0	66.2	83.2
1977 .....	44.5	28.8	61.2	87.0	42.2	37.8	71.6	85.3
1979 .....	47.2	29.6	58.9	86.6	43.0	37.4	67.3	83.1
1981 .....	51.0	30.8	63.1	87.9	46.5	41.2	64.8	86.9
1983 .....	50.2	33.7	59.0	86.1	50.1	45.3	68.1	84.8
1985 .....	43.2	23.9	59.3	79.1	42.4	36.2	63.3	81.0
1987 .....	53.3	36.7	56.1	82.0	54.8	49.7	71.6	84.2
1989 .....	57.2	38.7	58.7	84.7	57.8	53.5	70.0	89.1
1991 .....	53.6	38.3	56.6	83.8	57.4	53.4	66.6	88.7
1993 .....	43.5	20.8	43.7	80.7	41.1	34.0	46.8	87.3
1995 .....	47.0	23.2	40.1	78.5	43.9	36.1	52.0	86.0
1997 .....	45.3	21.0	42.4	74.1	41.9	33.7	49.6	78.5
1999 .....	52.8	28.8	45.5	79.5	47.4	41.4	46.6	83.3
<b>Physical sciences</b>								
1973 .....	61.6	33.6	78.9	90.9	47.6	42.2	82.9	99.2
1975 .....	64.1	27.9	60.7	93.2	43.8	36.6	77.3	85.1
1977 .....	63.2	28.9	95.7	88.5	51.6	40.5	77.5	92.4
1979 .....	59.1	25.5	73.7	84.7	52.0	39.0	72.1	91.7
1981 .....	69.3	25.2	94.3	88.1	57.9	49.4	84.5	97.9
1983 .....	70.4	33.8	82.7	88.2	66.2	56.3	85.3	84.8
1985 .....	64.3	18.7	86.6	84.6	50.8	35.7	78.7	91.4
1987 .....	80.9	66.7	69.9	90.2	68.7	56.0	97.1	93.1
1989 .....	77.9	49.2	82.1	88.0	72.4	61.9	89.0	90.6
1991 .....	69.9	44.1	78.8	87.2	67.2	55.1	88.5	100.0
1993 .....	63.1	21.3	64.9	84.5	58.2	43.9	70.0	94.5
1995 .....	62.8	21.0	41.9	84.1	53.9	37.8	60.2	86.7
1997 .....	64.2	30.0	71.4	77.7	53.4	41.2	67.9	96.5
1999 .....	68.0	39.3	69.9	80.5	57.0	46.7	65.5	89.4
<b>Mathematics</b>								
1973 .....	18.9	17.6	77.4	38.7	31.7	32.0	0.0	100.0
1975 .....	14.5	13.0	37.6	28.3	18.9	18.5	0.0	57.9
1977 .....	16.2	12.2	45.9	56.4	19.2	17.6	82.0	52.2
1979 .....	24.8	22.5	52.9	42.5	32.3	30.2	64.9	46.9
1981 .....	10.8	9.5	0.0	44.1	29.7	27.6	62.7	81.5
1983 .....	31.8	29.8	7.1	73.4	39.8	39.8	51.3	100.0
1985 .....	14.7	14.1	—	34.6	27.0	26.8	26.7	100.0
1987 .....	15.6	7.4	81.8	37.6	34.9	35.5	7.3	10.3
1989 .....	29.1	24.9	53.8	52.4	39.0	39.1	78.6	100.0
1991 .....	39.8	35.8	54.9	80.4	28.3	28.6	40.9	—
1993 .....	15.7	14.8	0.0	100.0	15.2	14.0	100.0	—
1995 .....	17.7	13.4	0.0	40.0	25.6	19.6	42.4	70.6
1997 .....	14.9	3.5	29.1	32.9	16.7	14.9	0.0	42.2
1999 .....	36.4	24.0	0.0	58.7	32.2	33.5	0.0	47.2
<b>Computer sciences</b>								
1973 .....	NA	NA	NA	NA	NA	NA	NA	NA
1975 .....	NA	NA	NA	NA	NA	NA	NA	NA
1977 .....	NA	NA	NA	NA	NA	NA	NA	NA
1979 .....	34.8	25.0	—	57.1	—	—	—	—
1981 .....	27.7	24.1	25.0	100.0	52.4	52.4	—	—
1983 .....	45.7	35.1	60.0	100.0	43.5	40.4	92.3	—
1985 .....	54.1	46.4	77.2	0.0	36.7	31.0	100.0	—
1987 .....	47.2	46.3	42.0	100.0	73.2	66.3	100.0	0.0
1989 .....	33.0	29.3	50.0	100.0	70.8	78.0	35.7	100.0
1991 .....	23.1	23.1	25.1	—	66.2	63.9	100.0	100.0
1993 .....	44.7	39.5	100.0	100.0	30.7	30.9	27.3	100.0
1995 .....	38.2	31.4	61.1	75.9	38.1	38.3	23.9	—
1997 .....	40.5	29.7	74.3	97.0	40.4	37.7	75.6	—
1999 .....	59.7	50.6	77.5	100.0	56.6	56.5	85.9	—

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-39.

**Recent doctorate holders in academia with Federal support, by field: 1973–99**  
 (Percentages)

Year	One to three years since Ph.D.				Four to seven years since Ph.D.			
	Total employed	Full-time faculty	Other full-time	Postdoc position	Total employed	Full-time faculty	Other full-time	Postdoc position
<b>Earth, atmospheric, and ocean sciences</b>								
1973 .....	55.3	45.9	87.5	87.1	56.4	53.7	87.3	100.0
1975 .....	50.7	38.4	85.3	74.2	54.0	49.8	97.0	100.0
1977 .....	44.3	22.5	60.5	94.4	46.9	38.3	82.1	100.0
1979 .....	67.2	41.3	97.3	96.7	49.6	43.1	72.3	100.0
1981 .....	66.1	43.2	79.7	100.0	57.2	53.3	72.7	0.0
1983 .....	61.8	36.7	75.7	92.8	64.5	59.5	100.0	66.7
1985 .....	56.0	33.4	83.9	96.4	59.6	50.6	81.2	100.0
1987 .....	64.2	42.3	87.9	89.6	71.1	61.9	88.9	100.0
1989 .....	70.4	52.8	88.5	90.1	81.2	78.0	92.9	93.8
1991 .....	76.0	61.7	100.0	77.4	76.6	75.3	100.0	64.1
1993 .....	68.2	33.0	97.8	74.2	59.9	50.2	72.6	100.0
1995 .....	65.4	35.8	87.4	88.0	66.4	58.9	86.2	100.0
1997 .....	67.3	35.0	74.7	94.2	57.1	49.4	70.7	69.4
1999 .....	61.7	42.9	89.7	79.8	65.3	62.7	75.6	55.5
<b>Life sciences</b>								
1973 .....	64.6	51.4	83.2	92.9	62.9	60.4	80.3	90.6
1975 .....	61.8	46.4	72.5	87.6	60.1	57.6	76.2	87.5
1977 .....	61.6	38.1	70.4	88.9	59.6	56.6	73.3	90.2
1979 .....	65.9	40.6	75.8	85.9	57.3	51.4	76.5	84.2
1981 .....	71.8	51.7	76.5	88.1	64.0	58.8	70.8	85.7
1983 .....	68.2	52.8	65.1	84.7	67.1	64.5	72.6	83.7
1985 .....	59.6	34.1	67.2	78.9	61.1	55.6	72.3	81.7
1987 .....	70.2	53.5	73.8	82.1	71.4	68.3	81.0	83.0
1989 .....	74.5	50.2	79.3	89.1	71.9	67.5	79.1	89.3
1991 .....	68.1	49.9	60.0	83.0	70.6	66.8	79.2	86.3
1993 .....	61.2	32.2	44.8	81.9	55.7	46.4	52.0	86.7
1995 .....	58.5	30.3	35.3	80.3	54.0	43.9	47.4	87.4
1997 .....	58.3	23.0	42.2	77.5	52.3	42.4	48.4	78.8
1999 .....	65.0	35.0	46.2	82.4	57.2	47.2	49.3	83.0
<b>Psychology</b>								
1973 .....	37.5	31.4	60.8	95.3	40.3	39.3	63.9	88.2
1975 .....	35.0	25.5	53.7	88.5	35.3	34.9	32.8	71.2
1977 .....	35.3	26.8	71.7	86.0	31.5	27.9	60.5	73.0
1979 .....	35.2	22.5	22.2	95.5	39.3	31.4	76.5	87.6
1981 .....	46.5	33.2	41.6	93.4	34.7	28.6	54.5	88.2
1983 .....	31.2	19.8	34.2	89.3	32.3	28.2	37.1	87.2
1985 .....	30.6	15.6	44.5	70.1	29.2	26.2	38.7	72.5
1987 .....	37.5	28.5	28.8	82.7	33.2	25.6	40.3	97.9
1989 .....	41.7	34.6	36.1	64.9	36.1	36.7	33.1	63.1
1991 .....	35.9	23.9	24.3	100.0	38.8	38.6	24.8	86.9
1993 .....	21.6	12.0	27.5	61.6	23.2	24.6	15.5	48.2
1995 .....	33.5	17.5	40.6	63.5	26.1	21.8	36.0	82.1
1997 .....	34.5	24.2	19.0	70.9	29.5	22.3	36.4	77.3
1999 .....	33.4	22.4	29.9	63.6	35.6	34.7	23.8	100.0
<b>Social sciences</b>								
1973 .....	26.8	25.7	68.0	23.9	30.8	30.5	40.3	100.0
1975 .....	23.1	22.5	29.0	61.7	26.2	26.2	42.4	39.2
1977 .....	24.8	24.2	12.3	61.4	24.6	23.2	56.3	48.0
1979 .....	26.6	22.8	37.6	97.5	20.8	19.2	52.2	70.8
1981 .....	20.4	16.3	48.7	56.0	24.3	24.3	25.2	60.0
1983 .....	28.2	23.6	49.0	77.9	28.1	23.6	57.5	93.8
1985 .....	15.6	12.3	27.8	44.4	19.3	15.7	51.0	41.0
1987 .....	22.5	20.9	34.5	21.4	29.9	27.7	54.0	0.0
1989 .....	25.6	24.7	24.3	41.9	33.2	31.6	51.4	83.9
1991 .....	21.7	19.5	38.8	31.7	36.6	33.8	44.2	100.0
1993 .....	11.2	7.2	25.4	88.2	14.9	14.4	21.9	100.0
1995 .....	15.9	10.7	28.8	80.8	17.8	16.0	41.8	49.8
1997 .....	14.1	10.9	26.8	33.7	17.4	15.6	26.3	57.7
1999 .....	21.1	15.2	26.1	77.1	22.8	21.7	31.3	48.1

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-39.

**Recent doctorate holders in academia with Federal support, by field: 1973–99**  
 (Percentages)

Year	One to three years since Ph.D.				Four to seven years since Ph.D.			
	Total employed	Full-time faculty	Other full-time	Postdoc position	Total employed	Full-time faculty	Other full-time	Postdoc position
<b>Engineering</b>								
1973 .....	53.4	47.8	80.2	87.1	52.6	51.8	92.0	66.7
1975 .....	53.7	48.9	65.8	83.8	54.4	53.1	82.3	100.0
1977 .....	55.2	47.2	84.8	72.9	52.9	52.3	64.8	64.9
1979 .....	55.5	48.5	71.9	99.4	55.1	58.8	33.8	16.9
1981 .....	54.4	43.2	100.0	100.0	65.6	61.9	83.9	100.0
1983 .....	47.1	36.7	58.2	98.3	64.3	62.2	99.0	100.0
1985 .....	43.9	37.8	66.1	94.5	47.6	46.3	66.4	0.0
1987 .....	53.3	43.7	79.2	75.7	65.5	64.2	97.6	100.0
1989 .....	56.0	48.9	71.9	73.3	70.8	68.6	91.8	100.0
1991 .....	66.6	62.1	67.7	89.9	73.2	73.0	79.7	100.0
1993 .....	43.4	32.1	65.1	68.7	51.2	49.4	65.9	70.3
1995 .....	51.1	38.5	50.3	72.6	62.1	60.3	72.5	86.5
1997 .....	50.0	35.5	66.4	66.3	51.3	48.4	62.5	60.5
1999 .....	58.5	40.0	70.9	78.1	55.5	56.4	44.8	94.2

— = Too few cases; NA = not available

NOTE: 1985, 1993–97 are not comparable to the other years and understate the degree of Federal support by asking whether work performed during the week of April 15 was supported by the Government. In other years, the question pertains to work conducted over the course of a year. Italics are used to highlight noncomparable values. Foreign-earned doctorates are excluded.

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients.

See text table 5-14 in Volume I.

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**Appendix table 5-40.**  
**Broad and fine fields for publications output data**

Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health sciences	Professional
Addictive diseases	Anatomy and morphology	Agriculture and food science	Analytical chemistry	Acoustics	Astronomy and astrophysics	Aerospace technology	Applied mathematics	Behavioral and comparative psychology	Anthropology and archaeology	Gerontology and aging	Communication Education
Allergy	Biochemistry and molecular biology	Botany	Applied chemistry	Applied physics	Earth and planetary science	Chemical engineering	General mathematics	Clinical psychology	Area studies	Health policy and services	Information and library science
Anesthesiology	Biomedicine	Dairy and animal science	General chemistry	Chemical physics	General physics	Civil engineering	Miscellaneous mathematics	Developmental and child psychology	Criminology	Demography	Law
Arthritis and rheumatism	Biophysics	Inorganic and nuclear chemistry	Fluids and plasmas	Miscellaneous physics	Environmental science	Computers	Probability and statistics	Experimental psychology	Economics	Public health	Management and business
Cancer	Biotechnology	Ecology	Organic chemistry	Geology	Meteorology and atmospheric sciences	Electrical and electronics engineering	General psychology	General social sciences	General social sciences	Rehabilitation	Social work
Cardiovascular system	Cell biology, cytology, and histology	Entomology	Physical chemistry	Nuclear and particle physics	Oceanography and limnology	Industrial engineering	Human factors	Geography and regional science	International relations	Social studies of medicine	Miscellaneous professional fields
Dentistry	Embryology	General zoology	Polymers	Optics	Solid state physics	Mechanical engineering	Miscellaneous psychology	Miscellaneous social sciences	Miscellaneous social sciences	Speech/language pathology and audiology	
Dermatology and venereal disease	Genetics and heredity	Marine and hydrobiology				Metals and metallurgy	Psychoanalysis	Social psychology	Planning and urban studies		
Endocrinology	General biomedical research	Miscellaneous biology				Miscellaneous engineering and technology			Political science and public administration		
Environmental and occupational health	Microbiology	Miscellaneous zoology				Nuclear technology			Science studies		
Fertility	Microscopy					Operations research and management			Sociology		
Gastroenterology	Miscellaneous biomedical research										
General and internal medicine	Nutrition and dietetics										
Geriatrics	Parasitology										
Hematology	Physiology										
Immunology	Virology										
Miscellaneous clinical											
Nephrology											
Neurology and neurosurgery											
Obstetrics and gynecology											
Ophthalmology											
Orthopedics											
Otorhinolaryngology											
Pathology											
Pediatrics											
Pharmacology											
Pharmacy											
Psychiatry											
Radiology and nuclear medicine											
Respiratory system											
Surgery											
Tropical medicine											
Urology											
Veterinary medicine											

SOURCE: CHI Research, Inc., Science Indicators database

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Appendix table 5-41.

**Number of scientific publications by region and country: 1986–99**

Region and country/economy	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>Worldwide</b>	462,746	449,888	464,896	478,300	481,213	482,890	502,245	489,009	510,796	515,512	518,959	512,649	523,695	528,643
<b>North America</b>														
<b>Total</b>	199,138	193,320	197,061	201,141	201,591	202,009	203,351	199,600	200,630	200,703	195,222	186,738	184,853	183,211
Canada	20,871	20,735	21,224	21,504	21,613	21,401	22,129	21,589	22,205	21,653	21,403	19,910	19,419	19,685
United States	178,266	172,585	175,837	179,637	179,978	180,608	181,222	178,011	178,425	179,051	173,819	166,829	165,434	163,526
<b>Latin America</b>														
<b>Total</b>	5,583	5,646	5,635	6,155	6,602	6,710	7,326	7,176	7,630	8,415	9,206	10,095	10,971	12,034
Antigua & Barbuda	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Argentina	1,459	1,475	1,428	1,450	1,556	1,427	1,421	1,442	1,607	1,742	1,970	2,119	2,175	2,361
Bahamas	2	2	4	3	1	0	2	1	1	1	1	1	1	1
Barbados	20	19	19	17	15	13	18	14	19	21	10	19	14	15
Belize	1	0	1	2	0	1	2	2	1	3	2	2	4	2
Bolivia	5	11	8	14	17	11	15	23	24	24	18	27	23	33
Brazil	1,777	1,766	1,799	2,065	2,291	2,531	2,958	2,656	2,822	3,134	3,492	3,908	4,513	5,144
Chile	673	624	663	687	792	751	758	786	684	768	806	850	835	879
Colombia	90	88	81	109	118	101	116	113	132	152	173	208	205	207
Costa Rica	44	48	54	55	53	53	61	54	62	63	64	73	63	69
Cuba	56	76	67	88	105	88	118	105	117	136	158	148	186	192
Dominica	0	0	0	0	0	0	0	0	2	0	0	0	1	0
Dominican Republic	9	7	6	6	7	11	5	9	7	6	7	6	6	6
Ecuador	10	13	13	17	20	29	18	13	27	27	29	39	27	20
El Salvador	2	1	5	3	6	2	1	2	3	1	4	2	0	0
Grenada	0	0	0	0	0	0	0	0	2	0	1	1	0	1
Guatemala	19	23	18	15	20	28	25	23	22	17	25	15	15	14
Guyana	5	7	4	4	5	6	8	4	4	6	5	4	5	4
Haiti	5	3	4	2	5	6	1	3	2	2	1	2	2	1
Honduras	4	1	2	5	6	9	3	6	5	6	6	10	9	11
Jamaica	57	89	76	62	56	57	46	53	62	71	56	49	38	44
Mexico	866	933	882	1,010	986	1,041	1,160	1,266	1,402	1,616	1,745	1,915	2,146	2,291
Nicaragua	4	7	10	5	5	8	7	7	4	3	9	11	5	8
Panama	27	38	36	38	44	35	25	35	35	32	26	37	29	37
Paraguay	6	7	7	9	7	4	10	2	3	5	8	4	8	4
Peru	51	50	69	67	75	68	70	61	58	58	64	63	59	56
St. Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	1
St. Lucia	0	0	0	0	0	4	1	5	2	0	1	2	2	1
St. Vincent	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Suriname	0	1	2	5	2	2	2	3	3	2	2	1	3	3
Trinidad-Tobago	48	34	37	52	45	46	52	52	56	49	40	41	42	37
Uruguay	31	33	44	48	56	63	74	76	76	84	100	110	109	144
Venezuela	307	293	292	311	298	314	349	356	386	386	380	429	447	448
West Indies Associated States	4	0	9	9	13	4	2	3	2	2	2	2	2	5
<b>Sub-Saharan Africa</b>														
<b>Total</b>	4,639	4,502	4,504	4,369	4,188	4,191	4,112	3,975	3,854	3,753	3,585	3,510	3,505	3,632
Angola	0	0	1	0	1	2	3	3	2	2	2	1	3	
Benin	0	6	7	5	6	13	8	11	9	12	12	19	20	20
Botswana	24	14	10	20	18	18	19	26	17	26	38	33	32	41

See explanatory notes, if any, and SOURCE at end of tables.

Appendix table 5-41.

**Number of scientific publications by region and country: 1986–99**

Region and country/economy	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Burkina Faso .....	14	0	20	15	16	23	19	19	17	15	12	20	25	23
Burundi .....	4	9	6	10	3	5	6	3	9	11	11	11	3	3
Cameroon .....	15	22	34	39	46	52	54	66	76	70	50	73	68	61
Cape Verde Islands .....	0	0	1	0	0	2	0	0	0	0	1	0	0	1
Central African Republic .....	4	9	9	12	11	5	6	4	3	6	3	5	4	4
Chad Republic .....	1	0	1	1	0	1	1	2	1	3	1	2	2	2
Comoros .....	0	0	0	0	0	0	0	1	0	1	0	0	1	0
Congo, Democratic Republic .....	31	30	38	31	29	21	26	21	19	18	15	15	6	6
Congo, Republic .....	15	18	14	17	15	14	18	8	10	6	9	8	10	13
Cote Ivoire .....	46	42	32	26	34	36	37	32	47	33	29	31	45	40
Equatorial Guinea .....	0	0	0	2	1	0	1	3	1	0	1	0	0	1
Eritrea .....	0	0	0	0	0	0	0	0	0	2	2	0	5	2
Ethiopia .....	45	60	65	56	67	90	83	80	81	96	84	103	71	95
Gabon Republic .....	16	12	20	11	14	14	14	11	14	16	10	16	18	20
Gambia .....	0	0	0	0	0	0	0	0	22	23	19	25	25	17
Ghana .....	25	32	35	34	38	45	66	45	63	60	72	78	58	73
Guinea Republic .....	1	2	2	4	3	3	3	3	2	3	2	2	3	2
Guinea-Bissau .....	1	0	0	1	1	1	2	3	2	1	3	3	2	6
Kenya .....	238	232	294	293	250	250	281	325	255	289	251	235	245	252
Lesotho .....	7	5	7	4	3	5	4	7	5	2	3	2	1	1
Liberia .....	5	4	4	3	6	7	5	1	1	2	1	1	0	1
Malagasy Republic .....	10	7	7	13	12	14	8	14	15	14	17	12	15	20
Malawi .....	21	12	28	24	27	27	15	29	37	40	37	38	29	36
Mali .....	12	6	12	7	8	8	6	9	13	14	15	12	13	11
Mauritania .....	3	1	0	2	1	1	0	4	2	2	2	2	2	2
Mauritius .....	2	1	3	2	8	7	5	8	12	7	6	2	8	16
Mozambique .....	10	8	8	6	4	8	7	13	7	9	10	9	9	14
Namibia .....	0	0	0	0	14	11	13	11	17	12	17	7	20	13
Niger .....	9	15	10	14	19	12	22	21	23	20	18	25	20	21
Nigeria .....	976	872	883	834	772	683	621	551	420	419	377	405	361	397
Rwanda .....	8	11	10	14	8	4	12	13	10	6	6	5	2	4
Sao Tome and Principe .....	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senegal Republic .....	0	0	0	0	0	0	0	0	72	65	58	58	64	66
Senegambia .....	69	78	70	76	79	73	85	94	4	0	0	0	0	0
Seychelles .....	1	2	0	0	0	1	1	1	1	3	6	2	1	2
Sierra Leone .....	10	12	15	6	9	10	9	5	6	6	11	8	1	3
Somalia .....	7	8	8	13	9	8	6	3	3	2	0	1	0	0
South Africa .....	2,653	2,670	2,509	2,437	2,327	2,434	2,298	2,204	2,221	2,120	2,066	1,926	2,008	2,018
Sudan .....	96	83	92	76	69	66	71	55	48	55	39	44	42	43
Swaziland .....	2	6	5	8	6	5	9	4	4	4	7	6	6	6
Tanzania .....	90	73	61	68	66	72	90	86	91	77	100	89	81	92
Togo .....	6	3	2	6	5	7	5	8	6	7	4	7	7	11
Uganda .....	23	27	17	15	25	17	25	37	31	40	38	46	47	59
Zambia .....	44	34	51	44	36	23	40	24	24	38	20	23	24	26
Zimbabwe .....	98	77	116	121	127	98	111	112	130	101	105	100	104	85

See explanatory notes, if any, and SOURCE at end of tables.

Appendix table 5-41.

**Number of scientific publications by region and country: 1986–99**

Region and country/economy	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>Near East and North Africa</b>														
<b>Total</b>	7,659	7,611	7,842	8,092	7,859	7,638	7,769	8,018	8,294	8,651	8,577	8,764	9,005	9,086
Algeria	81	61	66	70	96	97	114	114	120	141	139	139	150	162
Bahrain	24	19	31	53	46	41	34	35	44	39	39	30	20	29
Djibouti	0	0	1	2	3	1	1	2	1	1	1	0	1	0
Egypt	1,070	1,037	1,130	1,231	1,198	1,361	1,204	1,187	1,268	1,237	1,231	1,108	1,159	1,198
Iran	96	92	86	89	88	120	142	165	220	251	277	332	470	624
Iraq	222	187	225	232	164	81	79	74	67	47	39	35	24	21
Israel	4,989	4,921	4,887	4,936	4,747	4,536	4,807	5,029	5,029	5,269	5,092	5,321	5,211	5,025
Jordan	119	142	164	170	165	140	125	123	134	142	153	177	198	204
Kuwait	226	259	283	312	343	195	87	91	150	151	188	173	215	260
Lebanon	94	66	57	58	29	45	47	52	54	50	56	81	91	100
Libya	43	43	43	41	36	40	33	25	31	28	20	12	18	19
Malta	3	5	3	11	14	8	12	15	13	17	10	17	13	20
Morocco	76	68	105	108	91	121	161	153	175	222	238	271	348	386
North Yemen	7	8	7	12	12	16	10	0	0	0	0	0	0	0
Oman	2	1	11	20	26	31	36	40	42	49	59	53	68	73
Qatar	17	20	30	33	24	35	37	32	36	24	27	20	28	19
Saudi Arabia	487	552	575	553	611	574	600	639	644	687	680	613	602	528
South Yemen	1	2	3	1	2	0	1	0	0	0	0	0	0	0
Syria	15	25	18	28	33	30	48	47	47	47	51	57	41	55
Tunisia	76	83	94	106	101	112	119	86	129	139	146	188	211	237
United Arab Emirates	13	20	23	29	33	55	73	100	87	104	125	127	130	118
Yemen (undifferentiated)	0	0	0	0	0	0	11	4	7	7	10	7	10	10
<b>Western Europe</b>														
<b>Total</b>	143,496	140,423	143,335	149,140	151,254	153,192	163,346	161,481	173,611	176,689	181,657	181,844	187,500	188,548
Albania	0	1	2	11	6	15	8	12	17	17	17	10	13	17
Andorra	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Austria	2,342	2,271	2,254	2,584	2,551	2,596	2,832	2,820	2,873	3,148	3,225	3,432	3,630	3,580
Belgium	3,658	3,588	3,585	3,740	3,885	3,883	4,012	4,023	4,395	4,531	4,887	4,717	4,852	4,896
Bosnia and Herzegovina	0	0	0	0	0	0	0	14	11	5	6	8	13	9
Croatia	0	0	0	0	0	0	0	533	472	514	520	544	495	545
Cyprus	13	16	15	14	17	8	21	20	23	38	49	58	50	46
Denmark	3,636	3,432	3,461	3,625	3,579	3,588	3,835	3,711	4,026	3,946	3,993	3,950	4,083	4,131
Finland	2,831	2,829	2,764	2,862	2,920	3,050	3,182	3,235	3,566	3,655	3,805	3,897	3,800	4,025
France	20,874	20,152	21,281	21,749	21,584	21,591	23,903	23,722	25,704	26,265	26,590	26,509	27,421	27,374
Germany (East)	3,865	3,873	3,748	3,851	3,522	3,309	0	0	0	0	0	0	0	0
Germany	25,654	25,300	25,654	26,940	27,317	27,975	32,832	31,419	33,987	34,442	35,206	36,233	38,044	37,308
Greece	1,158	1,251	1,260	1,471	1,336	1,522	1,627	1,615	1,782	1,874	2,045	2,123	2,306	2,241
Iceland	59	56	69	68	88	98	101	112	119	138	128	127	153	114
Ireland	776	728	788	792	856	847	825	896	1,023	1,054	1,116	1,118	1,273	1,237
Italy	10,114	10,163	11,228	11,935	12,295	12,823	13,911	13,661	15,193	15,660	16,703	16,405	17,081	17,149
Liechtenstein	6	5	7	7	6	8	8	7	13	10	9	10	6	17
Luxembourg	9	10	8	11	17	14	21	19	26	28	16	28	30	29
Macedonia	0	0	0	0	0	0	0	26	26	32	33	49	35	36
Monaco	13	16	9	6	10	9	14	11	15	13	17	13	19	21
Netherlands	8,251	8,192	8,520	9,370	9,585	9,482	10,133	10,224	10,733	10,899	10,834	11,008	10,749	10,441

See explanatory notes, if any, and SOURCE at end of tables.

Appendix table 5-41.

**Number of scientific publications by region and country: 1986–99**

Region and country/economy	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Norway .....	2,293	2,185	2,177	2,183	2,324	2,278	2,455	2,377	2,517	2,576	2,515	2,501	2,607	2,598
Portugal .....	370	378	427	493	557	589	664	726	816	867	952	1,085	1,178	1,508
San Marino .....	0	0	0	0	1	0	0	0	0	0	0	1	1	0
Slovenia .....	0	0	0	0	0	0	0	377	413	388	417	517	538	599
Spain .....	4,871	4,986	5,410	5,885	6,486	6,826	8,347	8,648	9,352	9,870	10,592	11,210	11,591	12,289
Sweden .....	7,656	7,378	7,536	7,833	7,806	7,679	7,602	7,744	8,011	8,117	8,345	8,219	8,369	8,326
Switzerland .....	5,488	5,305	5,279	5,355	5,550	5,687	6,089	6,207	6,657	6,603	6,663	6,935	6,917	6,993
Turkey .....	386	436	501	640	714	797	985	1,076	1,271	1,560	1,962	2,116	2,397	2,761
United Kingdom .....	38,168	36,682	36,146	36,429	36,671	37,124	38,382	37,796	40,112	39,980	40,502	38,530	39,317	39,711
Vatican City .....	3	2	1	0	3	1	2	3	1	1	1	2	1	2
Yugoslavia .....	1,003	1,190	1,207	1,288	1,569	1,394	1,554	450	459	460	510	492	532	546
<b>Eastern Europe and Central Asia</b>														
<b>Total</b> .....	42,299	39,578	42,675	42,942	41,676	39,802	41,026	33,307	35,538	33,631	32,369	31,688	31,418	30,763
Armenia .....	0	0	0	0	0	0	0	158	165	167	155	178	152	142
Azerbaijan .....	0	0	0	0	0	0	0	179	169	134	107	71	81	66
Bulgaria .....	1,158	1,125	1,122	1,199	1,165	1,110	1,156	1,291	954	882	888	897	828	801
Byelarus .....	0	0	0	0	0	0	0	600	725	668	551	547	553	564
Czech Republic .....	0	0	0	0	0	0	0	0	1,963	1,825	2,079	2,024	2,094	2,005
Czechoslovakia .....	3,127	2,889	2,793	2,941	2,964	2,744	2,946	3,099	83	4	0	0	0	0
Estonia .....	0	0	0	0	0	0	0	0	164	187	217	219	222	254
Georgia .....	0	0	0	0	0	0	0	0	150	127	133	108	128	126
Hungary .....	1,920	1,781	1,711	1,791	1,660	1,696	1,630	1,554	1,607	1,657	1,630	1,717	1,850	1,958
Kazakhstan .....	0	0	0	0	0	0	0	0	238	178	157	132	119	115
Kyrgyzstan .....	0	0	0	0	0	0	0	0	26	30	14	13	9	15
Latvia .....	0	0	0	0	0	0	0	0	175	152	146	158	141	147
Lithuania .....	0	0	0	0	0	0	0	0	135	176	162	182	198	214
Moldova .....	0	0	0	0	0	0	0	0	147	155	137	133	111	95
Poland .....	3,983	3,751	4,053	4,062	3,817	3,671	3,781	3,475	3,735	4,186	4,174	4,019	4,318	4,523
Romania .....	562	476	387	504	358	376	549	469	645	596	816	751	770	785
Russia .....	0	0	0	0	0	0	0	0	18,251	20,337	18,512	17,108	17,147	16,352
Slovakia .....	0	0	0	0	0	0	0	0	0	1,076	1,059	1,070	950	1,025
Tajikistan .....	0	0	0	0	0	0	0	0	61	61	31	25	29	15
Turkmenistan .....	0	0	0	0	0	0	0	0	20	9	11	6	7	4
USSR .....	31,550	29,557	32,611	32,444	31,712	30,204	30,965	120	0	0	0	0	0	0
Ukraine .....	0	0	0	0	0	0	0	2,729	2,727	2,643	2,479	2,163	2,189	2,194
Uzbekistan .....	0	0	0	0	0	0	0	268	278	290	336	261	206	236
<b>Asia</b>														
<b>Total</b> .....	47,712	47,022	51,847	54,178	55,764	57,287	62,712	62,558	67,534	69,684	74,055	75,861	81,674	86,405
Afghanistan .....	4	2	5	1	0	1	1	0	0	1	0	0	0	0
Bangladesh .....	124	112	98	98	110	97	134	141	123	156	138	130	122	148
Bhutan .....	0	1	0	3	1	0	2	2	3	2	0	0	2	1
Brunei .....	1	1	2	4	2	7	14	4	11	5	12	9	10	20
Cambodia .....	0	0	0	0	1	0	1	1	1	3	3	3	1	5
China .....	2,911	3,146	3,989	4,325	4,999	4,986	5,602	5,882	6,093	6,995	7,212	9,081	10,155	11,675
Hong Kong .....	84	634	621	775	827	783	824	959	1,075	1,372	1,776	2,080	1,863	1,817
India .....	9,925	9,051	9,030	9,410	8,809	9,008	9,471	8,944	9,186	8,727	8,839	8,439	8,775	9,217
Indonesia .....	72	66	67	85	103	82	79	93	106	115	122	123	121	142

See explanatory notes, if any, and SOURCE at end of tables.

Appendix table 5-41.

**Number of scientific publications by region and country: 1986–99**

Region and country/economy	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan .....	31,957	30,920	34,390	35,214	36,191	36,974	40,129	39,310	42,148	42,338	44,735	43,891	46,951	47,826
Laos .....	0	0	0	0	0	1	1	1	0	2	1	2	5	2
Malaysia .....	186	192	208	234	225	252	234	272	326	343	333	304	336	416
Maldives Republic .....	0	0	0	0	0	1	1	0	0	1	2	0	1	3
Mongolia .....	9	12	13	11	12	14	12	14	12	6	17	13	9	8
Myanmar .....	8	14	15	9	9	7	13	9	14	13	9	3	5	10
Nepal .....	18	14	20	18	20	20	25	21	24	35	24	35	34	39
North Korea.....	2	4	7	3	2	3	2	1	0	1	0	0	3	1
Pakistan .....	161	210	196	230	209	249	243	260	259	282	250	232	250	277
Philippines .....	151	128	129	145	152	141	135	138	131	134	133	159	146	164
Singapore.....	358	401	413	501	552	561	696	773	924	1,064	1,018	1,164	1,371	1,653
South Korea .....	516	672	771	1,006	1,118	1,295	1,620	1,919	2,561	3,234	4,029	4,619	5,552	6,675
Sri Lanka .....	52	94	107	99	102	82	75	69	74	65	73	61	66	84
Taiwan .....	904	1,067	1,428	1,682	1,993	2,380	3,060	3,394	4,069	4,396	4,893	5,053	5,361	5,655
Thailand .....	226	235	286	260	270	280	274	290	340	303	337	356	440	470
Vietnam .....	45	48	53	66	59	64	65	62	54	94	101	106	96	98
<b>Pacific</b>														
<b>Total</b> .....	12,219	11,785	11,998	12,283	12,281	12,062	12,603	12,896	13,705	13,987	14,288	14,149	14,769	14,964
Australia .....	10,121	9,831	9,836	10,297	10,082	10,025	10,463	10,753	11,448	11,742	11,954	11,793	12,252	12,525
Fiji .....	27	25	24	12	14	16	10	27	11	9	7	10	8	13
Kiribati .....	0	1	0	0	0	1	0	0	0	0	0	0	0	0
Marshall Islands .....	0	0	0	0	0	0	3	1	1	2	2	3	0	1
Micronesia .....	0	1	0	0	0	0	1	0	0	7	2	0	0	1
Nauru .....	0	0	1	0	0	0	0	0	0	0	0	0	0	0
New Zealand .....	1,994	1,860	2,078	1,913	2,131	1,968	2,074	2,066	2,192	2,181	2,290	2,308	2,469	2,375
Pap	69	59	57	56	48	42	39	40	43	34	32	31	31	36
Solomon Islands .....	4	1	1	2	2	5	3	2	3	3	0	3	5	6
Tonga .....	1	0	1	0	0	1	1	0	1	2	0	0	1	1
Tuvalu .....	0	0	0	0	0	2	0	1	0	0	0	0	1	0
Vanuatu .....	3	3	1	2	3	1	4	0	2	3	1	1	1	3
Western Samoa .....	2	4	1	2	2	2	5	4	5	4	0	1	1	3

NOTES: Publication counts are from a 1985 set of journals classified and covered by the Institute of Scientific Information's Science and Social Science Citation Indexes. Article counts are based on fractional assignments; for example, an article with two authors from different countries is counted as one-half of an article for each country. Former U.S.S.R. consists of the present East European and Central Asian countries that were former members. Germany's data are split between former East and West Germany prior to 1992.

SOURCE: Institute for Scientific Information, Science Citation Index and Social Science Citation Index; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

See figure 5-32 in Volume 1.

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Appendix table 5-42.

**Per capita output of scientific articles: 1998**

(Per million inhabitants)

Country/economy	Number of Publications	Country/economy	Number of Publications
Switzerland	973.40	Brunei	32.38
Sweden	945.44	Bahrain	31.26
Israel	873.87	Oman	29.50
Denmark	770.27	Saudi Arabia	29.01
Finland	737.43	Brazil	27.21
Spain	714.96	Georgia	23.10
Netherlands	684.75	Tunisia	22.61
United Kingdom	665.77	Mexico	22.39
New Zealand	650.98	Moldova	22.13
Canada	640.87	Lebanon	21.62
United States	612.04	Botswana	20.55
Monaco	603.13	Gambia	20.23
Norway	588.20	Venezuela	19.22
Iceland	558.03	Egypt	18.87
Australia	545.72	Costa Rica	17.92
Belgium	475.49	Macedonia	17.61
France	465.97	Cuba	16.79
Germany	463.69	Malaysia	15.16
Austria	449.36	Belize	15.06
Singapore	433.44	Jamaica	14.71
Japan	371.42	St. Lucia	14.47
Ireland	343.59	Seychelles	13.92
Italy	296.60	Morocco	12.54
Slovenia	271.34	Namibia	12.09
Taiwan	244.71	Solomon Islands	11.54
Greece	219.27	Panama	10.60
Czech Republic	203.40	Azerbaijan	10.28
Slovakia	190.15	Tonga	10.10
Hungary	182.91	Fiji	9.87
Liechtenstein	181.25	India	8.96
Estonia	175.03	Zimbabwe	8.89
South Korea	119.58	Uzbekistan	8.58
Portugal	118.18	Kenya	8.36
Kuwait	115.17	China	8.20
Poland	111.67	Suriname	7.77
Russia	111.30	Iran	7.59
Bulgaria	100.28	Kazakhstan	7.34
Chile	95.00	Thailand	7.18
Hong Kong	89.73	Senegal Republic	7.05
Croatia	73.33	Dominica	6.85
Luxembourg	70.96	Papua New Guinea	6.71
Cyprus	66.14	Mauritius	6.64
Lithuania	62.06	Swaziland	6.27
Argentina	60.19	Guyana	5.77
Latvia	60.15	Vanuatu	5.46
Byelarus	54.01	Colombia	5.01
Barbados	51.50	Algeria	5.00
Yugoslavia	50.11	Cameroon	4.78
South Africa	48.49	Albania	3.77
United Arab Emirates	47.76	Congo	3.59
Ukraine	43.53	Sri Lanka	3.51
Jordan	43.30	Kiribati	3.49
Armenia	40.13	Libya	3.41
Turkey	37.78	Bahamas	3.40
Qatar	37.47	Bosnia and Hercegovina	3.37
Malta	35.54	Benin	3.31
Romania	34.22	Côte d'Ivoire	3.13
Uruguay	33.14	Ghana	3.11
Trinidad-Tobago	32.53		

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-42.

**Per capita output of scientific articles: 1998**

(Per million inhabitants)

Country/economy	Number of Publications	Country/economy	Number of Publications
Kyrgyzstan	3.11	Madagascar	1.01
Nigeria	2.99	Bangladesh	0.97
Bolivia	2.84	Comoros	0.94
Malawi	2.79	Turkmenistan	0.74
Gabon Republic	2.79	Dominican Republic	0.74
Syria	2.67	Mauritania	0.67
Tanzania	2.51	Indonesia	0.59
Tajikistan	2.47	Lesotho	0.63
Zambia	2.44	Mozambique	0.53
Peru	2.38	Yemen	0.45
Burkina Faso	2.34	Burundi	0.38
Uganda	2.25	Guinea Republic	0.35
Ecuador	2.18	Rwanda	0.30
Sao Tome and Principe	2.11	Haiti	0.27
Niger	2.01	Chad Republic	0.27
Bhutan	1.98	Sierra Leone	0.27
Philippines	1.94	North Korea	0.13
Pakistan	1.90	Cambodia	0.12
Togo	1.53	Congo, Democratic Republic	0.11
Honduras	1.51	Myanmar	0.11
Paraguay	1.49	Liberia	0.10
Sudan	1.48	Angola	0.05
Nepal	1.48	Afghanistan	0.01
Guinea-Bissau	1.46	Antigua and Barbuda	0.00
Guatemala	1.37	El Salvador	0.00
Vietnam	1.25	Grenada	0.00
Mali	1.21	St. Kitts and Nevis	0.00
Eritrea	1.16	St. Vincent	0.00
Ethiopia	1.16	Cape Verde Islands	0.00
Nicaragua	1.11	Equatorial Guinea	0.00
Djibouti	1.10	Somalia	0.00
Iraq	1.09	Andorra	0.00
Laos	1.09	Marshall Islands	0.00
Central African Republic	1.06	Micronesia	0.00

NOTES: Article counts (on a per capita basis) are based on fractional assignments; for example, an article with two authors from different countries is counted as one-half of an article for each country. Taiwan's population is from CIA World Factbook, 1998; data for all other countries are from the World Bank.

SOURCE: Institute for Scientific Information, Science and Social Science Citation Indexes; CHI Research, Inc., Science Indicators database; World Bank, World Bank Development Indicators 2000; U.S. Central Intelligence Agency, CIA World Factbook 1998; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**  
 (Percentages)

	All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional
Region and country/economy													
(Percentage share)													
<b>Worldwide (1999)</b>													
<b>Total</b>	528,643	29.0	14.7	7.0	12.5	15.3	5.4	6.8	2.0	2.0	2.7	0.9	1.8
<b>North America (1999)</b>													
<b>Total</b>	183,211	31.9	16.9	6.7	7.7	10.1	6.2	6.0	1.8	3.4	4.2	1.5	3.6
Canada	19,685	29.8	15.6	11.3	8.5	7.3	7.3	7.2	1.9	3.6	4.1	1.5	1.9
United States	163,526	32.2	17.0	6.1	7.6	10.4	6.1	5.8	1.8	3.4	4.2	1.5	3.8
<b>Latin America (1999)</b>													
<b>Total</b>	12,034	24.2	13.9	13.2	12.2	19.9	6.0	5.4	2.0	0.8	1.2	0.9	0.4
Antigua and Barbuda	0	na	na	na	na	na	na	na	na	na	na	na	na
Argentina	2,361	24.2	13.5	16.1	14.0	18.7	5.2.0	4.6	1.7	1.0	0.9	0.1	0.1
Bahamas	1	0.0	33.3	66.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Barbados	15	19.3	2.7	38.7	8.7	13.3	0.0	0.0	6.7	3.3	6.7	0.0	0.0
Belize	2	66.7	13.3	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bolivia	33	42.5	6.1	36.1	0.9	1.8	3.7	1.5	0.0	0.0	5.2	2.4	0.0
Brazil	5,144	23.0	14.8	10.3	11.9	23.3	4.7	6.2	2.1	0.7	1.0	1.6	0.4
Chile	879	33.6	13.1	14.2	11.8	8.9	9.9	3.3	2.8	0.7	1.2	0.1	0.4
Colombia	207	25.5	10.8	19.3	9.6	20.4	3.5	5.3	1.1	1.6	1.2	1.6	0.2
Costa Rica	69	29.2	8.9	36.8	8.6	6.6	4.7	3.4	1.5	0.4	0.0	0.0	0.0
Cuba	192	27.3	17.9	10.5	20.1	15.3	2.2	5.7	0.3	0.7	0.0	0.0	0.0
Dominica	0	na	na	na	na	na	na	na	na	na	na	na	na
Dominican Republic	6	55.4	10.7	16.1	0.0	0.0	0.0	0.0	0.0	0.0	17.9	0.0	0.0
Ecuador	20	46.5	6.6	16.7	1.5	6.1	15.2	1.5	0.0	0.0	0.0	2.5	3.5
El Salvador	0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grenada	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guatemala	14	44.2	28.3	15.9	3.6	0.0	0.0	0.0	0.0	0.7	7.2	0.0	0.0
Guyana	4	45.2	7.1	11.9	0.0	11.9	23.8	0.0	0.0	0.0	0.0	0.0	0.0
Haiti	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Honduras	110	62.3	9.4	23.6	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0
Jamaica	44	31.8	12.6	11.0	17.6	0.5	8.5	2.3	1.8	1.6	8.0	1.8	2.7
Mexico	2,2910	22.1	12.4	13.5	10.7	21.9	8.4	5.8	1.9	0.9	1.5	0.5	0.5
Nicaragua	8	43.2	21.0	18.5	0.0	0.0	12.3	3.7	0.0	0.0	0.0	0.0	0.0
Panama	370	9.3	18.3	51.5	0.0	6.0	4.6	2.7	0.0	4.9	2.7	0.0	0.0
Paraguay	4	80.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Peru	56	51.2	10.3	14.0	1.8	5.5	8.2	5.0	0.0	0.9	1.4	0.9	0.9
St. Kitts and Nevis	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100	0.0	0.0
St. Lucia	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St. Vincent	0	na	na	na	na	na	na	na	na	na	na	na	na
Suriname	3	16.1	3.2	77.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trinidad-Tobago	37	38.5	4.3	33.2	9.2	0.0	1.3	5.4	0.0	0.0	2.7	2.7	2.7
Uruguay	144	28.2	18.9	17.4	12.6	14.3	4.4	1.0	2.6	0.0	0.7	0.0	0.0
Venezuela	448	18.4	14.3	12.8	18.1	15.2	8.8	7.1	2.6	0.7	1.2	0.3	0.6
West Indies Associated States ....	5	47.8	15.2	10.9	0.0	21.7	6.5	0.0	0.0	0.0	0.0	0.0	0.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**  
 (Percentages)

All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional	
Region and country/economy	(Percentage share)												
<b>Sub-Saharan Africa (1999)</b>													
<b>Total</b> .....	3,632	34.1	11.0	22.0	6.8	5.7	7.5	2.8	1.5	1.6	4.2	0.8	1.8
Angola .....	3	29.4	0.0	35.3	0.0	0.0	5.9	29.4	0.0	0.0	0.0	0.0	0.0
Benin .....	20	28.1	9.5	30.7	0.0	31.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Botswana .....	41	20.0	2.4	15.4	12.9	4.1	6.1	2.4	1.2	0.0	23.2	2.4	9.8
Burkina Faso .....	23	45.8	10.2	31.1	3.6	1.3	3.1	2.2	0.0	0.0	3.1	0.0	0.0
Burundi .....	3	17.2	0.0	82.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cameroon .....	61	34.0	13.0	23.0	7.7	10.2	2.8	2.5	1.6	1.6	1.6	0.3	1.6
Cape Verde Islands .....	1	66.7	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0
Central African Republic .....	4	55.0	25.0	12.5	0.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0	0.0
Chad Republic .....	2	37.5	0.0	0.0	0.0	0.0	0.0	0.0	62.5	0.0	0.0	0.0	0.0
Comoros .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Congo, Democratic Republic .....	6	79.0	12.9	1.6	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Congo, Rep. ....	13	77.2	6.3	10.2	0.0	3.9	2.4	0.0	0.0	0.0	0.0	0.0	0.0
Cote Ivoire .....	40	40.4	3.0	28.8	4.0	0.0	4.3	0.0	6.3	0.0	12.3	0.8	0.0
Equatorial Guinea .....	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eritrea .....	2	16.7	27.8	16.7	0.0	0.0	11.1	0.0	0.0	27.8	0.0	0.0	0.0
Ethiopia .....	95	58.3	6.5	23.8	0.5	3.0	3.5	0.3	0.5	0.1	2.3	0.0	1.1
Gabon Republic .....	20	42.2	31.4	15.7	3.9	0.0	0.0	0.0	2.5	4.9	0.0	0.0	0.0
Gambia .....	17	91.8	4.7	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0
Ghana .....	73	39.0	7.4	22.2	4.4	0.7	3.4	4.8	0.0	1.8	9.8	1.1	5.5
Guinea Republic .....	2	13.6	13.6	45.5	0.0	0.0	22.7	0.0	0.0	0.0	0.0	0.0	0.0
Guinea-Bissau .....	6	91.8	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kenya .....	252	56.0	7.1	25.5	0.6	0.6	2.9	0.6	0.0	1.0	4.6	0.4	0.6
Lesotho .....	1	23.1	76.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Liberia .....	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Madagascar .....	20	30.3	6.1	46.0	3.5	2.5	7.1	0.0	0.0	2.5	2.5	0.0	0.0
Malawi .....	36	57.1	3.9	25.1	0.0	0.0	1.9	2.8	0.0	0.0	5.0	0.0	4.2
Mali .....	11	45.1	9.7	40.7	0.0	0.0	1.8	0.0	0.0	0.0	2.7	0.0	0.0
Mauritania .....	2	31.8	0.0	31.8	0.0	0.0	36.4	0.0	0.0	0.0	0.0	0.0	0.0
Mauritius .....	16	10.4	14.0	48.8	18.3	0.0	1.8	3.0	0.0	0.0	3.0	0.0	0.0
Mozambique .....	14	29.2	16.7	22.9	0.0	0.0	11.8	10.4	0.0	0.0	0.0	9.0	0.0
Namibia .....	13	6.2	8.5	42.6	3.9	0.0	26.4	0.0	0.0	3.9	7.8	0.0	0.0
Niger .....	21	28.2	11.7	48.4	0.0	0.0	2.3	0.0	0.0	0.0	4.7	0.0	4.7
Nigeria .....	397	34.3	9.0	30.5	5.1	4.0	4.4	4.9	1.5	0.0	3.4	1.0	1.9
Rwanda .....	4	88.4	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sao Tome and Principe .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Senegal Republic .....	66	47.9	19.2	19.5	3.5	2.6	5.3	0.0	0.0	0.0	1.8	0.0	0.0
Seychelles .....	2	70.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25
Sierra Leone .....	3	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Somalia .....	0	na	na	na	na	na	na	na	na	na	na	na	na

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**  
(Percentages)

	All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional
Region and country/economy		(Percentage share)											
South Africa .....	2,018	26.9	12.2	18.2	9.7	8.0	10.6	3.2	2.2.0	2.5	3.9	0.7	1.9
Sudan .....	43	4.0	8.2	24.3	2.8	2.6	4.2	3.5	0.0	0.0	0.0	0.0	0.0
Swaziland .....	6	0.0	0.0	31.7	7.9	7.9	4.8	0.0	7.9	7.9	0.0	15.9	15.9
Tanzania .....	92	40.6	19.7	24.5	1.1	2.2	1.4	1.4	0.0	0.0	7.4	0.8	1.1
Togo .....	11	74.3	2.8	7.3	1.8	0.0	4.6	0.0	0.0	0.0	9.2	0.0	0.0
Uganda .....	59	57.2	5.1	27.8	0.0	0.0	1.2	0.0	0.0	0.3	3.4	3.4	1.7
Zambia .....	26	41.2	3.8	29.4	0.0	3.8	0.0	5.7	3.8	0.0	7.6	2.7	1.9
Zimbabwe .....	85	31.5	13.7	29.7	3.3	2.4	2.8	3.5	0.0	0.4	7.3	1.5	4.1
<b>Near East and North Africa (1999)</b>													
<b>Total</b> .....	9,086	27.9	9.9	7.2	16.0	16.6	3.9	9.3	3.4	1.6	1.9	0.8	1.3
Algeria .....	162	6.2	5.3	4.8	24.3	34.0	4.3	16.3	3.9	0.0	0.6	0.0	0.3
Bahrain .....	29	18.3	0.0	1.7	17.3	6.2	6.9	43.3	1.0	0.0	0.0	5.2	0.0
Djibouti .....	0				0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Egypt .....	1,198	19.6	5.9	8.3	31.9	17.3	4.2	11.4	0.4	0.3	0.4	0.0	0.3
Iran .....	624	17.9	3.1	2.5	48.7	13.5	1.9	6.9	4.2	0.6	0.2	0.0	0.5
Iraq .....	21	28.2	6.6	8.5	23.5	4.7	0.0	25.8	2.3	0.0	0.0	0.0	0.0
Israel .....	5,025	31.3	13.1	7.6	7.9	18.3	3.4	6.5	3.8	2.5	2.9	1.1	1.7
Jordan .....	204	26.2	6.8	13.3	14.6	7.5	7.8	19.2	1.0	1.0	1.2	0.6	1.0
Kuwait .....	260	32.0	10.0	4.5	11.8	4.8	8.6	21.5	3.3	1.0	1.0	0.4	1.3
Lebanon .....	100	47.7	11.4	5.0	4.8	9.6	9.7	5.7	3.0	1.0	0.0	0.5	1.5
Libya .....	19	35.4	12.2	10.6	15.9	5.3	0.0	17.5	0.0	0.0	0.0	0.0	3.7
Malta .....	20	55.7	5.0	2.5	0.0	0.0	0.0	19.9	0.0	0.0	5.0	0.0	10.0
Morocco .....	386	10.2	4.9	6.6	26.9	26.6	5.2	10.0	8.9	0.1	0.6	0.0	0.0
Oman .....	73	31.3	5.5	13.1	3.8	13.4	8.3	21.2	2.7	0.0	0.0	0.0	0.4
Qatar .....	19	29.7	8.1	0.0	23.2	4.3	5.4	23.2	0.0	0.0	5.4	0.0	0.0
Saudi Arabia .....	528	41.9	6.2	5.7	10.8	7.3	3.7	18.5	2.0	0.7	0.9	1.1	1.4
Syria .....	55	33.8	7.4	30.2	15.4	5.8	2.4	4.2	0.0	0.0	0.0	0.0	0.9
Tunisia .....	237	22.7	5.2	4.6	30.3	16.7	3.9	5.8	9.8	0.0	1.1	0.0	0.0
United Arab Emirates .....	118	38.1	13.9	5.1	6.6	4.4	6.9	12.3	0.0	3.1	4.7	4.1	0.8
Yemen .....	10	34.3	5.9	12.7	12.7	14.7	3.9	0.0	14.7	0.0	0.0	0.0	0.0
<b>Western Europe (1999)</b>													
<b>Total</b> .....	188,548	32.5	14.6	6.8	12.4	14.9	5.5	5.8	2.2	1.5	2.3	0.6	1.0
Albania .....	17	17.4	8.1	9.9	10.5	5.8	23.3	13.4	2.9	0.0	8.7	0.0	0.0
Andorra .....	0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Austria .....	3,580	44.7	14.1	5.7	10.2	12.4	4.2	3.6	1.7	0.8	1.9	0.2	0.6
Belgium .....	4,896	33.5	15.9	8.2	12.4	14.0	4.1	5.1	2.0	1.5	1.9	0.3	0.9
Bosnia and Herzegovina .....	9	41.1	5.6	0.0	0.0	16.7	0.0	14.4	11.1	0.0	11.1	0.0	0.0
Croatia .....	545	23.0	8.7	3.5	23.9	14.6	4.1	3.9	1.4	1.3	15.2	0.0	0.4
Cyprus .....	46	11.2	14.7	9.7	8.2	18.8	5.6	4.8	6.5	2.2	9.7	0.0	8.6
Denmark .....	4,131	37.0	17.9	11.2	7.7	10.7	6.1	3.6	1.6	1.0	2.0	0.5	0.7
Finland .....	4,025	42.1	14.5	9.4	8.3	9.2	4.1	5.3	1.3	1.7	1.5	1.3	1.4
France .....	27,374	27.7	15.4	5.4	14	18.2	6.4	6.0	4.0	0.9	1.4	0.1	0.4
Germany .....	37,308	29.6	14.9	5.5	14.7	18.9	4.8	5.8	2.1	1.5	1.4	0.2	0.6

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**  
 (Percentages)

	All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional
<b>Region and country/economy</b>		(Percentage share)											
Greece .....	2,241	30.1	7.5	8.8	13.0	16.2	7.3	11.5	2.9	0.4	1.2	0.2	1.0
Iceland .....	114	39.5	13.1	9.3	4.2	5.9	16.0	1.1	0.7	1.0	5.7	2.4	0.9
Ireland .....	1,237	29.1	19.0	13.8	9.7	11.5	2.5	5.7	2.4	1.4	3.2	0.8	1.0
Italy .....	17,149	35.1	13.4	4.6	12.3	18.2	5.7	6.4	2.4	0.6	0.8	0.1	0.3
Liechtenstein .....	17	0.0	0.0	0.0	42.2	15.7	0.0	30.1	0.0	0.0	12.0	0.0	0.0
Luxembourg .....	29	29.8	20.9	9.6	3.4	4.1	2.4	5.1	3.4	0.0	16.4	0.0	5.1
Macedonia .....	36	13.4	5.6	2.8	54.2	14.2	0.0	7.0	0.0	0.0	0.0	0.0	2.8
Monaco .....	21	9.4	1.4	16.4	13.1	0.0	59.2	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands.....	10,441	38.3	15.3	7.4	9.1	10.5	5.6	4.2	1.1	3.0	2.9	1.1	1.4
Norway .....	2,598	34.7	12.5	14.2	8.7	5.9	9.0	4.7	1.6	2.3	4.2	1.0	1.1
Portugal .....	1,508	16.2	12.7	10.4	17.9	21.9	6.7	9.6	1.9	0.7	1.4	0.1	0.5
San Marino .....	0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slovenia .....	599	17.8	13.2	4.4	17.1	23.8	4.4	12.1	3.1	0.2	2.2	0.5	1.2
Spain .....	12,289	24.7	14.1	11.8	19.0	14.4	5.8	4.7	3.0	0.7	1.1	0.2	0.5
Sweden .....	8,326	40.8	16.4	7.4	8.4	11.3	3.8	5.7	1.3	1.4	2.0	1.0	0.6
Switzerland .....	6,993	35.1	16.6	5.1	13.2	16.9	5.3	4.1	1.2	0.8	1.2	0.3	0.4
Turkey .....	2,761	44.4	6.0	4.5	15.4	10.0	6.4	9.8	1.1	0.4	1.4	0.1	0.5
United Kingdom .....	39,711	34.0	14.4	6.8	9.3	11.0	5.6	6.0	1.5	2.7	4.6	1.7	2.4
Vatican City .....	2	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yugoslavia .....	546	18.9	8.0	6.1	22.0	23.1	3.2	14.9	2.6	0.2	0.5	0.0	0.5
<b>Eastern Europe and Central Asia (1999)</b>													
<b>Total</b> .....	30,763	7.3	10.5	5.1	26.3	33.9	4.8	7.6	2.0	0.8	1.5	0.0	0.2
Armenia .....	142	3.5	9.8	1.6	21.3	54.1	4.0	2.3	2.5	0.2	0.7	0.0	0.0
Azerbaijan .....	66	7.6	4.6	0.5	35.6	44.4	0.5	4.6	2.3	0.0	0.0	0.0	0.0
Bulgaria .....	801	12.7	14.3	5.5	26.5	20.5	5.2	10.6	3.2	0.3	1.0	0.0	0.1
Byelarus .....	564	3.2	8.2	3.5	23.8	44.5	1.0	8.2	1.9	0.5	4.6	0.0	0.6
Czech Republic .....	2,0050	11.6	14.9	8.2	26.4	21.0	4.0	6.2	2.1	1.7	3.7	0.1	0.0
Estonia .....	261	18.4	15.5	18.0	10.8	20.6	7.8	1.1	2.0	2.0	3.3	0.0	0.6
Georgia .....	112	6.3	3.8	1.8	18.6	45.9	8.6	7.6	7.2	0.2	0.0	0.0	0.0
Hungary .....	1,958	21.5	16.2	5.8	27.5	16.0	3.4	5.0	2.8	0.4	1.0	0.1	0.4
Kazakhstan .....	104	2.1	4.0	5.3	33.1	33.0	8.5	8.5	4.3	0.0	1.2	0.0	0.0
Kyrgyzstan .....	10	8.0	5.0	0.0	8.0	55.0	0.0	10.0	0.0	0.0	15.0	0.0	0.0
Latvia .....	153	5.4	13.0	3.1	37.3	25.6	1.4	11.9	1.6	0.0	0.7	0.0	0.0
Lithuania .....	214	9.1	12.2	6.4	20.2	37.7	3.5	7.1	2.6	0.0	0.7	0.0	0.5
Moldova .....	92	4.3	2.0	4.3	23.7	58.1	1.1	4.8	1.1	0.5	0.0	0.0	0.0
Poland .....	4,523	12.0	8.6	5.4	29.7	30.0	3.6	6.5	3.2	0.4	0.5	0.0	0.1
Romania .....	785	3.0	3.3	2.0	36.8	34.4	1.7	11.9	6.6	0.3	0.1	0.1	0.1
Russia .....	15,654	3.9	10.6	5.0	25.0	38.5	5.8	7.3	1.2	0.7	1.7	0.0	0.3
Slovakia .....	871	13.1	18.8	4.3	27.5	15.4	2.7	5.2	2.4	6.0	4.6	0.0	0.0
Tajikistan .....	20	1.5	27.0	10.2	33.2	10.2	15.3	0.0	2.6	0.0	0.0	0.0	0.0
Turkmenistan .....	0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ukraine .....	2,194	4.2	3.6	2.5	22.2	44.8	3.9	15.9	2.2	0.1	0.6	0.0	0.0
Uzbekistan .....	236	1.6	3.2	1.6	50.6	35.8	3.6	2.8	0.8	0.0	0.1	0.0	0.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**

(Percentages)

	All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional
Region and country/economy		(Percentage share)											
<b>Asia (1999)</b>													
<b>Total</b>	86,405	23.6	12.7	5.8	18.8	21.4	3.2	11.1	1.6	0.4	0.7	0.2	0.4
Afghanistan	0	na	na	na	na	na	na	na	na	na	na	na	na
Bangladesh	148	18.8	11.1	12.9	13.4	13.8	6.1	13.0	0.7	0.5	4.9	4.0	0.7
Bhutan	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brunei	20	22.2	0.0	9.9	18.7	11.3	23.2	4.9	4.9	0.0	0.0	0.0	4.9
Cambodia	5	53.7	0.0	37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	0.0
China	11,675	10.0	9.3	4.20	26.0	27.1	4.3	14.3	3.6	0.2	0.5	0.1	0.4
Hong Kong	1,817	23.2	6.3	6.8	11.3	13.7	3.5	18.1	3.7	2.7	4.5	1.7	4.4
India	9,217	13.8	14.6	6.8	25.9	19.2	5.4	11.0	1.2	0.1	1.3	0.1	0.4
Indonesia	142	21.1	14.8	28.9	8.2	5.4	10.2	2.7	0.0	0.6	6.0	1.8	0.4
Japan	47,826	30.0	14.5	5.9	16.0	21.2	2.5	7.9	1.0	0.4	0.4	0.1	0.1
Laos	2	0.0	0.0	16.7	0.0	0.0	27.8	0.0	0.0	55.6	0.0	0.0	0.0
Malaysia	416	21.5	8.0	17.0	32.5	4.9	2.0	10.2	0.5	0.8	1.2	0.1	1.3
Maldives	3	0.0	0.0	40.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0
Mongolia	8	32.1	14.3	11.9	15.5	0.0	20.2	6.0	0.0	0.0	0.0	0.0	0.0
Myanmar	10	46.9	19.8	0.0	10.4	5.2	12.5	5.2	0.0	0.0	0.0	0.0	0.0
Nepal	39	52.2	10.3	23.5	0.0	0.0	7.0	1.3	0.0	2.6	3.4	0.0	0.0
North Korea	1	76.9	0.0	0.0	0.0	0.0	0.0	23.1	0.0	0.0	0.0	0.0	0.0
Pakistan	277	24.5	7.4	16.8	19.8	16.6	1.7	7.8	1.6	1.2	1.4	1.0	0.4
Philippines	164	14.4	14.4	47.4	2.4	3.0	5.4	0.3	0.6	1.7	7.0	1.8	1.3
Singapore	1,653	14.9	8.3	3.9	14.7	22.1	1.3	25.7	3.1	0.7	2.6	0.3	2.3
South Korea	6,675	16.5	9.1	3.4	20.8	25.2	2.4	18.9	2.0	0.2	0.8	0.1	0.6
Sri Lanka	84	28.8	17.4	25.1	7.5	7.3	3.1	6.1	1.2	0.4	1.8	1.4	0.0
Taiwan	5,655	23.8	8.9	5.3	18.3	17.7	4.3	17.6	1.8	0.3	1.0	0.4	0.7
Thailand	470	45.0	11.2	16.7	9.6	3.3	3.6	5.7	0.5	0.4	1.7	1.4	1.0
Vietnam	98	20.1	6.7	15.0	8.7	17.7	5.6	9.7	14.1	0.3	1.8	0.3	0.0
<b>Pacific (1999)</b>													
<b>Total</b>	14,964	29.2	12.6	16.6	8.0	7.6	7.8	5.2	1.7	3.2	4.1	1.8	2.2
Australia	12,525	29.8	13.5	14.7	8.1	8.0	7.7	5.3	1.8	2.9	4.2	1.9	2.0
Fiji	13	15.7	0.7	23.9	5.2	0.0	17.2	7.5	11.2	0.0	14.9	0.0	3.7
Kiribati	0	na	na	na	na	na	na	na	na	na	na	na	na
Marshall Islands	1	16.7	0.0	0.0	0.0	0.0	83.3	0.0	0.0	0.0	0.0	0.0	0.0
Micronesia	1	76.9	23.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nauru	0	na	na	na	na	na	na	na	na	na	na	na	na
New Zealand	2,375	26.1	8.3	26.2	7.6	5.4	8.1	4.5	1.1	4.6	3.8	1.1	3.4
Papua New Guinea	36	43.3	5.3	30.2	2.2	8.4	4.7	0.0	0.0	0.0	0.0	0.0	5.6
Solomon Islands	6	8.5	0.0	71.2	0.0	0.0	20.3	0.0	0.0	0.0	0.0	0.0	0.0
Tonga	1	37.5	0.0	62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tuvalu	0	na	na	na	na	na	na	na	na	na	na	na	na
Vanuatu	3	2.9	0.0	23.5	0.0	0.0	14.7	0.0	0.0	0.0	58.8	0.0	0.0
Western Samoa	3	0.0	10.7	89.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**  
(Percentages)

	All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional
Region and country/economy													
(Percentage share)													
<b>Worldwide (1986)</b>													
<b>Total</b>	462,746	29.8	15.0	7.9	12.5	12.2	4.4	6.7	1.8	2.7	3.7	0.9	2.7
<b>North America (1986)</b>													
<b>Total</b>	199,138	30.7	14.7	8.5	7.5	9.5	4.9	6.6	1.8	4.3	5.1	1.6	4.9
Canada	20,871	26.4	13.2	14.3	8.6	8.2	6.4	7.7	1.8	4.2	4.9	1.1	2.9
United States	178,266	31.2	14.9	7.8	7.3	9.6	4.7	6.5	1.8	4.3	5.2	1.6	5.1
<b>Latin America (1986)</b>													
<b>Total</b>	5,583	28.0	14.8	11.4	12.6	14.5	6.5	3.8	2.1	1.9	2.8	0.9	0.7
Antigua and Barbuda	0	na	na	na	na	na	na	na	na	na	na	na	na
Argentina	1,459	30.6	16.2	9.9	16.8	14.9	4.2	4.1	0.9	0.6	1.5	0.0	0.1
Bahamas	2	58.3	0.0	0.0	0.0	0.0	41.7	0.0	0.0	0.0	0.0	0.0	0.0
Barbados	20	22.7	0.0	15.2	10.1	0.0	1.5	0.0	0.0	12.6	22.7	0.0	15.2
Belize	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bolivia	5	72.0	12.0	4.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brazil	1,777	21.6	15.7	9.1	10.7	18.9	7.7	4.0	3.0	3.8	2.7	2.2	0.6
Chile	673	42.0	12.5	9.8	13.2	5.0	8.9	3.7	1.9	0.5	1.6	0.5	0.4
Colombia	90	31.2	11.0	38.0	2.4	2.0	4.4	2.2	2.8	2.2	2.2	0.0	1.7
Costa Rica	44	33.9	7.6	30.3	2.1	3.0	6.2	0.0	0.0	2.3	11.5	0.0	3.4
Cuba	56	24.3	22.0	7.2	10.7	22	3.2	7.2	1.8	0.0	1.8	0.0	0.0
Dominica	0	na	na	na	na	na	na	na	na	na	na	na	na
Dominican Republic	9	35.1	10.6	26.6	0.0	0.0	0.0	10.6	10.6	0.0	0.0	0.0	7.4
Ecuador	10	17.5	7.8	43.7	0.0	4.9	0.0	2.9	0.0	0.0	9.7	9.7	4.9
El Salvador	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grenada	0	na	na	na	na	na	na	na	na	na	na	na	na
Guatemala	19	39.5	28.6	10.8	0.0	0.0	5.4	5.4	0.0	0.0	10.8	0.0	0.0
Guyana	5	80.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haiti	5	90.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Honduras	4	13.2	0.0	86.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jamaica	57	29.4	7.5	17.9	7.5	7.0	0.3	1.7	0.9	1.7	17.4	0.0	8.7
Mexico	866	28.3	13.4	11.3	10.8	16.2	7.2	4.4	2.3	1.5	3.7	0.4	0.4
Nicaragua	4	28.6	0.0	14.3	0.0	0.0	28.6	0.0	0.0	0.0	14.3	0.0	14.3
Panama	27	2.2	10.9	56.2	0.0	1.1	10.9	0.0	0.0	5.5	9.1	0.0	3.6
Paraguay	6	32.8	24.6	36.1	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Peru	51	30.5	7.0	44.2	4.9	0.6	7.0	1.0	0.0	0.0	1.0	1.9	1.9
St. Kitts and Nevis	0	na	na	na	na	na	na	na	na	na	na	na	na
St. Lucia	0	na	na	na	na	na	na	na	na	na	na	na	na
St. Vincent	0	na	na	na	na	na	na	na	na	na	na	na	na
Suriname	0	na	na	na	na	na	na	na	na	na	na	na	na
Trinidad-Tobago	48	21.7	3.1	29.5	7.2	5.2	3.1	11.4	0.0	0.0	14.5	0.0	4.1
Uruguay	31	41.1	23.3	11.3	8.1	6.5	3.2	0.0	0.0	3.2	3.2	0.0	0.0
Venezuela	307	18.8	18.2	9.3	20.0	18.1	5.9	2.1	3.4	1.7	2.4	0.0	0.0
West Indies Associated States ....	4	39.0	12.2	24.4	0.0	0.0	0.0	0.0	0.0	0.0	12.2	0.0	12.2

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**

(Percentages)

All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional	
Region and country/economy	(Percentage share)												
<b>Sub-Saharan Africa (1986)</b>													
<b>Total</b> .....	4,639	36.7	10.2	20.0	7.7	4.2	5.8	4.2	1.0	1.4	4.8	1.5	2.7
Angola .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Benin .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Botswana .....	24	16.5	4.1	26.0	0.0	4.1	12.4	0.0	0.0	5.4	0.0	0.0	8.3
Burkina Faso .....	14	40.1	8.5	51.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burundi .....	4	42.9	0.0	23.8	7.1	23.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cameroon .....	15	23.2	18.5	28.5	27.8	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Cape Verde Islands .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Central African Republic .....	4	38.6	52.3	0.0	11.4	0.0	0.0	0.0	0.0	0.0	22.7	0.0	0.0
Chad Republic .....	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Comoros .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Congo, Democratic Republic .....	31	64.6	5.5	6.5	1.0	6.5	3.2	3.2	0.0	1.6	5.8	1.6	0.0
Congo, Republic .....	15	42.8	10.5	24.3	13.2	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0
Côte d'Ivoire .....	46	28.0	13.5	40.7	9.1	2.8	2.2	1.1	0.0	0.0	0.0	1.5	1.1
Equatorial Guinea .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Eritrea .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Ethiopia .....	45	49.2	0.7	26.6	7.1	4.4	0.7	0.0	3.3	0.0	5.5	2.2	0.0
Gabon Republic .....	16	82.3	8.2	3.2	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0
Gambia .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Ghana .....	25	55.1	8.1	22.3	0.0	1.2	4.0	0.0	0.0	0.0	1.2	4.0	4.0
Guinea Republic .....	1	0.0	0.0	37.5	62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guinea-Bissau .....	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kenya .....	238	54.5	11.6	22.2	0.5	0.3	1.5	0.0	0.0	0.8	4.1	2.5	1.8
Lesotho .....	7	40.3	0.0	7.5	0.0	14.9	7.5	0.0	0.0	0.0	29.9	0.0	0.0
Liberia .....	5	74.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0
Madagascar .....	10	41.2	16.5	13.4	3.1	10.3	15.5	0.0	0.0	0.0	0.0	0.0	0.0
Malawi .....	21	32.9	1.4	38.0	0.0	0.0	4.7	0.0	0.0	0.0	18.8	0.0	4.7
Mali .....	12	44.5	2.5	25.2	2.5	8.4	0.0	0.0	0.0	8.4	8.4	0.0	0.0
Mauritania .....	3	35.7	17.9	0.0	0.0	0.0	10.7	35.7	0.0	0.0	0.0	0.0	0.0
Mauritius .....	2	0.0	0.0	50.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
Mozambique .....	10	45.9	3.1	10.2	0.0	0.0	10.2	0.0	0.0	0.0	30.6	0.0	0.0
Namibia .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Niger .....	9	31.8	37.6	7.1	11.8	5.9	5.9	0.0	0.0	0.0	0.0	0.0	0.0
Nigeria .....	976	31.6	9.4	23.2	6.8	1.9	5.3	3.9	0.9	2.2	5.4	3.8	5.6
Rwanda .....	8	58.0	0.0	24.7	3.7	0.0	0.0	0.0	0.0	0.0	12.3	0.0	0.0
Sao Tome and Principe .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Senegal Republic .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Senegambia .....	69	28.8	24.6	16.0	9.3	1.9	5.5	0.0	1.5	1.5	3.6	0.0	7.3
Seychelles .....	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sierra Leone .....	10	41.7	4.9	29.1	0.0	0.0	0.0	4.9	0.0	0.0	0.0	19.4	0.0
Somalia .....	7	29.9	7.5	41.8	14.9	0.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0
South Africa .....	2,653	36.0	10.9	17.0	9.7	5.9	7.1	5.6	1.3	1.3	3.6	0.4	1.4

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**  
 (Percentages)

	All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional
<b>Region and country/economy</b>		(Percentage share)											
Sudan .....	96	43.5	6.3	35.1	3.1	2.3	0.5	1.0	0.5	0.0	6.6	1.0	0.0
Swaziland .....	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Tanzania .....	90	41.1	1.4	32.9	1.1	0.0	1.1	2.0	0.0	0.6	10.0	3.3	6.2
Togo .....	6	35.1	40.4	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.5
Uganda .....	23	31.9	14.4	28.4	6.1	4.4	8.7	0.0	0.0	0.0	2.2	4.4	0.0
Zambia .....	44	34.6	0.0	6.4	0.0	2.3	8.0	2.3	0.0	0.0	22.4	10.3	13.7
Zimbabwe .....	98	40.8	7.4	28.5	1.0	0.5	1.3	0.0	0.0	2.5	11.3	0.0	6.6
<b>Near East and North Africa (1986)</b>													
<b>Total</b> .....	7,659	30.1	11.7	9.6	14.1	10.7	3.4	8.5	2.8	2.0	3.9	0.7	2.3
Algeria .....	81	19.5	5.0	13.9	19.1	23.9	2.0	8.3	3.1	0.6	5.0	0.0	0.0
Bahrain .....	24	5.5	1.3	0.0	4.3	12.8	0.0	69.4	0.0	0.0	0.0	2.1	4.3
Djibouti .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Egypt .....	1,070	14.2	6.4	11.9	40.5	8.8	3.4	11.7	0.9	0.4	1.4	0.2	0.2
Iran .....	96	18.0	7.5	8.4	23.8	11.5	7.0	10.3	9.7	0.0	3.7	0.0	0.0
Iraq .....	222	14.1	6.0	13.7	37.1	10.6	7.8	9.6	0.2	0.0	0.0	0.5	0.5
Israel .....	4,989	33.7	14.0	9.2	7.0	11.5	2.9	6.6	3.2	2.9	5.1	0.8	3.1
Jordan .....	119	19.5	5.3	11.6	17.6	9.5	6.3	14.3	4.6	0.8	4.2	2.5	3.8
Kuwait .....	226	35.9	17.1	3.5	16.0	4.9	5.7	11.4	2.6	0.4	1.3	0.7	0.4
Lebanon .....	94	47.9	12.9	9.5	5.1	8.5	0.5	1.8	0.0	4.0	6.0	2.6	1.1
Libya .....	43	37.0	6.9	21.9	10.4	6.9	4.2	6.9	4.6	0.0	1.2	0.0	0.0
Malta .....	3	16.7	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7
Morocco .....	76	21.4	8.6	17.6	19.4	8.1	8.2	8.9	2.6	0.0	4.0	0.0	1.3
North Yemen .....	7	23.1	0.0	0.0	15.4	0.0	0.0	15.4	0.0	0.0	30.8	0.0	15.4
Oman .....	2	0.0	0.0	29.4	0.0	0.0	17.6	17.6	0.0	0.0	0.0	0.0	29.4
Qatar .....	17	47.7	0.0	21.5	4.7	7.6	0.0	19.2	0.0	0.0	0.0	0.0	0.0
Saudi Arabia .....	487	39.0	6.8	6.4	14.9	8.6	3.9	15.8	2.1	0.1	0.8	0.3	1.2
South Yemen .....	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Syria .....	15	11.3	9.9	38.4	9.9	4.0	0.0	13.2	13.2	0.0	0.0	0.0	0.0
Tunisia .....	76	27.3	4.1	8.3	24.4	16.3	10.0	0.7	7.9	0.0	1.0	0.0	0.0
United Arab Emirates .....	13	28.0	8.0	8.0	12.0	16.0	4.0	20.0	0.0	0.0	4.0	0.	
<b>Western Europe (1986)</b>													
<b>Total</b> .....	143,496	35.3	15.2	7	12.9	12	3.8	5.6	1.9	1.7	2.9	0.5	1.3
Albania .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Andorra .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Austria .....	2,342	45.6	12.6	4.4	10.7	10.3	3.0	4.4	2.4	1.0	4.3	0.3	1.0
Belgium .....	3,658	38.7	15.9	6.5	12.8	11.0	2.9	3.7	2.4	1.6	3.1	0.3	1.2
Cyprus .....	13	15.4	0.0	53.8	0.0	0.0	3.8	3.8	7.7	0.0	7.7	0.0	7.7
Denmark .....	3,636	54.5	15.3	6.6	5.2	8.3	2.7	2.2	1.4	0.9	1.7	0.6	0.6
Finland .....	2,831	49.0	13.7	8.4	7.5	5.9	3.3	4.9	1.6	1.3	2.1	0.6	1.6
France .....	20,874	29.4	16.8	5.4	15.4	17.5	4.6	5.0	1.9	1.2	2.1	0.1	0.5
Germany (East) .....	3,865	21.9	15.4	9.8	24.9	13.4	2.4	6.9	1.6	0.9	2.1	0.0	0.8
Germany (West) .....	25,654	29.7	14.4	6.2	15.3	15.0	3.5	8.0	2.5	2.2	2.3	0.2	0.8

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**  
(Percentages)

	All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional
<b>Region and country/economy</b>		(Percentage share)											
Greece .....	1,158	19.3	9.5	9.1	16.4	17.8	8.1	12.7	3.6	0.3	1.9	0.2	1.1
Iceland .....	59	37.6	12.7	9.6	0.8	8.5	19.5	0.8	4.2	0.0	1.7	3.4	1.4
Ireland .....	776	36.7	10.3	9.7	11.6	9.5	4.4	3.7	3.1	1.2	6.5	0.9	2.4
Italy .....	10,114	40.0	14.0	3.7	15.3	14.4	3.7	4.2	2.2	0.8	1.3	0.1	0.4
Liechtenstein .....	6	0.0	8.3	0.0	0.0	91.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Luxembourg .....	9	34.1	0.0	5.5	0.0	0.0	0.0	27.5	0.0	0.0	11.0	0.0	22
Monaco .....	13	17.2	3.7	22.4	7.5	0.0	39.6	7.5	0.0	0.0	2.2	0.0	0.0
Netherlands.....	8,251	37.3	16.9	8.7	9.9	10.9	3.9	3.6	1.9	2.4	2.8	0.5	1.3
Norway .....	2,293	44.3	13.4	10.5	9.0	4.6	6.3	3.2	1.5	2.3	4.0	0.3	0.7
Portugal .....	370	22.0	13.3	5.6	17.7	20	2.5	9.8	3.6	0.7	2.8	0.0	1.9
San Marino .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Slovenia .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Spain .....	4,871	20.3	19.6	7.2	30.6	11.3	2.8	4.2	2.1	0.5	1.0	0.1	0.3
Sweden .....	7,656	50.2	16.5	6.8	7.3	6.7	2.7	4.2	1.1	1.2	2.1	0.5	0.7
Switzerland .....	5,488	39.3	16.6	4.2	10.9	15.6	3.3	4.5	1.4	1.4	2.3	0.2	0.4
Turkey .....	386	27.5	6.6	5.3	21.8	10.9	7.5	15.5	2.0	0.5	1.4	0.5	0.4
United Kingdom .....	38,168	36.8	14.7	9.0	8.8	8.3	4.0	6.1	1.6	2.4	4.6	1.0	2.6
Vatican City .....	3	0.0	0.0	0.0	40.7	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yugoslavia .....	1,003	23.5	11.6	3.7	23.1	18.7	4.0	8.6	2.8	1.2	1.7	0.1	1.1
<b>Eastern Europe and Central Asia (1986)</b>													
<b>Total</b> .....	42,299	14.3	17.6	3.2	27.8	24.2	4.1	4.9	1.5	0.9	1.4	0.0	0.2
Bulgaria .....	1,158	7.3	44.1	2.0	19.2	16.6	2.3	5.9	1.7	0.3	0.5	0.0	0.1
Czechoslovakia .....	3,127	18.7	13.3	5.3	31.0	9.4	4.5	3.4	1.1	5.1	8.1	0.1	0.1
Hungary .....	1,920	23.6	19.7	4.9	27.5	10.4	2.4	2.5	4.4	0.7	2.8	0.3	1.0
Poland .....	3,983	14.1	10.1	6.0	31.0	24.7	2.3	6.8	2.9	0.3	1.0	0.1	0.7
Romania .....	562	9.3	8.4	0.9	37.2	21.4	0.9	13.8	6.7	0.4	0.7	0.0	0.2
USSR .....	31,550	13.6	18.1	2.6	27.2	26.8	4.5	4.8	1.1	0.6	0.7	0.0	0.1
<b>Asia (1986)</b>													
<b>Total</b> .....	47,712	22.5	14.5	7.5	20.5	15.6	3.5	12.2	1.3	0.5	1.3	0.1	0.4
Afghanistan .....	4	65.8	0.0	34.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bangladesh .....	124	27.9	10.3	11.6	10.9	13.7	2.7	5.5	0.0	0.0	15.1	1.6	0.8
Bhutan .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Brunei .....	1	76.9	0.0	0.0	0.0	0.0	23.1	0.0	0.0	0.0	0.0	0.0	0.0
Cambodia .....	0	na	na	na	na	na	na	na	na	na	na	na	na
China .....	2,911	18.8	9.2	3.8	18.2	27.2	6.8	10.8	3.6	0.1	1.0	0.2	0.4
Hong Kong .....	84	1.5	0.0	0.0	0.0	0.0	0.0	1.2	0.0	21.2	49.9	2.4	23.8
India .....	9,925	11.3	16.4	8.7	27.2	15.4	6.3	10.5	1.3	0.3	2.0	0.1	0.4
Indonesia .....	72	25.1	5.6	30.4	6.7	0.7	11.3	3.5	0.0	0.4	10.6	1.8	3.8
Japan .....	31,957	26.6	15.0	7.1	19.0	15.0	2.3	12.7	1.0	0.6	0.6	0.1	0.2
Laos .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Malaysia .....	186	26.5	9.0	20.5	17.4	4.6	5.3	2.8	1.2	1.6	4.8	0.5	5.7
Maldives .....	0	na	na	na	na	na	na	na	na	na	na	na	na

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-43.

**Regional and country portfolio of scientific articles, by field: 1999 and 1986**  
(Percentages)

	All Fields (Number of articles)	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology	Mathematics	Psychology	Social sciences	Health	Professional
Region and country/economy											(Percentage share)		
Mongolia .....	9	10.8	18.3	12.9	26.9	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Myanmar .....	8	66.3	24.1	3.6	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0
Nepal .....	18	14.7	0.0	13.6	5.4	0.0	3.8	10.9	0.0	5.4	35.3	5.4	5.4
North Korea .....	2	31.3	37.5	0.0	31.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pakistan .....	161	9.6	7.3	27.2	19.3	15.7	5.0	7.8	1.6	0.3	4.4	0.6	1.2
Philippines .....	151	11.7	4.4	60.9	2.3	1.7	1.3	2.6	0.0	0.7	11.2	1.2	2.0
Singapore .....	358	32.1	7.0	5.0	8.4	12.4	4.3	14.1	3.5	0.8	7.7	0.0	4.7
South Korea .....	516	7.0	5.3	3.4	37.5	15.6	2.6	20.8	2.3	0.3	3.8	0.0	1.5
Sri Lanka .....	52	21.2	6.4	30.1	6.8	9.7	12.8	3.9	0.0	1.6	7.8	0.0	0.0
Taiwan .....	904	17.7	6.7	6.5	17.3	15.6	1.9	24.9	2.5	0.7	6.1	0.0	0.1
Thailand .....	226	35.8	19.1	10.6	6.5	4.7	4.9	6.5	0.6	0.0	7.7	1.1	2.3
Vietnam .....	45	5.1	2.2	4.9	14.1	40.3	3.4	8.9	21.3	0.0	0.0	0.0	0.0
		<b>Pacific (1986)</b>											
<b>Total</b> .....	12,219	29.5	12.2	18.7	7.9	6.2	7.6	4.6	1.8	3.3	5.3	0.9	1.9
Australia .....	10,121	29.1	12.7	17.1	8.3	6.8	7.7	5.0	1.9	3.2	5.7	0.9	1.9
Fiji .....	27	14.8	0.0	44.4	7.4	0.0	13.0	0.0	0.0	0.0	9.3	0.0	11.1
Kiribati .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Marshall Islands .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Micronesia .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Nauru .....	0	na	na	na	na	na	na	na	na	na	na	na	na
New Zealand .....	1,994	31.9	10.3	26.4	6.3	3.5	7.3	3.0	1.5	3.8	3.4	0.9	1.8
Papua New Guinea .....	69	33.4	6.7	25.1	2.2	1.5	2.9	0.0	0.0	2.9	13.8	0.0	11.7
Solomon Islands .....	4	73.0	0.0	27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tonga .....	1	83.3	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tuvalu .....	0	na	na	na	na	na	na	na	na	na	na	na	na
Vanuatu .....	3	0.0	0.0	83.9	16.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Western Samoa .....	2	66.7	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

na = not applicable

NOTES: Article counts are based on fractional assignments; for example, an article with two authors from different countries is counted as one-half of an article for each country. Articles are assigned to fields based on journal field classifications developed by CHI Research, Inc., based on a 1985 set of journals classified and covered by the Institute for Scientific Information's Science and Social Science Citation Indexes.

SOURCES: Institute for Scientific Information, Science Citation Index and Social Science Citation Index: CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

Appendix table 5-44.

**Distribution of U.S. scientific and technical articles, by sector and field: 1988, 1994, and 1999**  
(Percentages)

Year	Number of articles	Total S&E	Physics	Chemistry	Earth and space	Mathematics	Clinical medicine	Biomedical research	Biology	Engineering and technology	Psychology	Social sciences	Health and professional
<b>All U.S. sectors</b>													
1988 .....	175,837	100.0	10.3	7.6	4.6	2.3	31.1	15.5	7.5	6.5	3.9	4.7	6.0
1994 .....	178,425	100.0	11.0	7.5	5.4	1.8	31.0	16.6	6.8	6.7	3.3	4.3	5.6
1999 .....	163,526	100.0	10.4	7.6	6.1	1.8	32.2	17.0	6.1	5.8	3.4	4.2	5.3
<b>Academic</b>													
1988 .....	126,169	100.0	9.1	7.6	4.1	2.8	30.0	16.2	8.0	5.2	4.8	5.5	6.6
1994 .....	129,104	100.0	10.5	7.6	4.8	2.3	29.5	17.3	7.0	5.7	4.1	5.0	6.2
1999 .....	120,149	100.0	10.0	7.9	5.4	2.3	30.2	17.8	6.3	5.0	4.1	5.0	6.0
<b>Industry</b>													
1988 .....	14,810	100.0	21.8	15.5	3.8	1.1	16.4	10.0	2.7	20.0	1.0	1.8	5.9
1994 .....	14,598	100.0	16.6	14.4	4.8	0.7	22.2	12.2	3.5	19.3	0.6	1.2	4.6
1999 .....	11,431	100.0	14.5	12.6	5.1	0.8	26.6	13.3	2.9	17.9	0.8	1.3	4.1
<b>Nonprofit</b>													
1988 .....	12,278	100.0	2.0	1.7	3.6	0.4	60.0	16.7	3.4	1.8	2.2	4.0	4.3
1994 .....	12,801	100.0	2.0	2.2	3.6	0.3	60.0	17.9	3.1	1.3	1.9	4.0	3.8
1999 .....	12,597	100.0	1.5	2.1	5.2	0.3	61.2	17.1	3.2	0.9	1.7	3.2	3.6
<b>Federal Government</b>													
1988 .....	14,287	100.0	6.9	5.3	8.4	0.6	36.7	17.1	13.0	5.2	1.4	3.0	2.6
1994 .....	13,913	100.0	8.6	5.4	9.7	0.4	33.2	17.5	13.2	5.5	1.2	3.0	2.3
1999 .....	11,582	100.0	8.8	4.5	11.3	0.5	33.9	17.4	12.4	5.6	1.2	2.3	2.0
<b>FFRDCs</b>													
1988 .....	4,943	100.0	44.8	10.3	11.4	1.2	4.7	8.4	2.1	15.4	0.1	1.1	0.6
1994 .....	4,885	100.0	44.4	9.1	13.5	0.9	5.0	8.4	1.6	15.3	0.2	1.1	0.4
1999 .....	4,631	100.0	44.8	12.9	15.4	0.7	4.1	8.2	1.0	12.4	0.0	0.3	0.2
<b>Other government</b>													
1988 .....	2,080	100.0	0.3	1.8	5.8	0.1	50.6	12.7	10.6	1.6	4.4	2.4	9.7
1994 .....	1,816	100.0	0.1	2.5	5.9	0.2	47.6	11.9	11.7	1.6	5.2	3.2	10.1
1999 .....	1,480	100.0	0.3	1.7	8.1	0.2	49.5	12.5	12.2	1.1	3.6	2.5	8.3
<b>Unknown sector</b>													
1988 .....	1,270	100.0	2.9	2.5	3.8	0.7	36.2	5.6	4.4	7.2	12.4	7.7	16.7
1994 .....	1,307	100.0	3.1	1.8	4.6	0.7	40.0	6.7	5.9	7.6	9.1	5.4	15.3
1999 .....	1,657	100.0	4.6	3.5	5.0	0.7	44.2	8.0	5.8	6.7	4.3	5.0	12.3

FFRDCs = Federally Funded Research and Development Centers

NOTES: Article counts are based on fractional assignments; for example, an article with two authors from different sectors is counted as one-half of an article for each sector. Multi-authored articles with foreign authors are counted similarly. Articles are assigned to fields based on journal field classifications developed by CHI Research, Inc., based on a 1985 set of journals classified and covered by the Institute for Scientific Information's Science and Social Science Citation Indexes. Sector article counts and field shares may not add to total because of rounding.

SOURCES: Institute for Scientific Information, Science Citation Index and Social Science Citation Index; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS), special tabulations.

See figure 5-38 in Volume 1.

Science &amp; Engineering Indicators – 2002

Appendix table 5-45.

**Incidence of multiple corporate authorship of U.S. scientific and technical articles, by field: 1988, 1994, and 1999**

Years	All Sectors				Academic				Industry				Non-profit				State and local government			
	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored												
	Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles		
<b>Total science and engineering</b>																				
1988 .....	185,355	47.6	37.2	10.4	147,249	52.3	42.1	10.2	19,763	50.2	41.9	8.2	19,307	72.0	62.4	9.6	3,603	75.2	69.7	5.4
1994 .....	193,833	54.1	38.2	15.9	156,073	57.9	42.4	15.5	21,847	63.1	48.6	14.5	21,315	75.9	61.5	14.4	3,393	78.3	69.9	8.3
1999 .....	183,906	60.3	38.7	21.6	150,964	63.1	42.4	20.6	19,360	73.0	51.8	21.2	22,240	80.1	60.6	19.5	3,023	83.5	72.6	10.9
<b>Physics</b>																				
1988 .....	19,804	45.2	28.8	16.5	13,954	53.3	35.9	17.4	4,130	45.0	35.1	9.9	374	61.0	42.0	19.0	8	50.0	50.0	0.0
1994 .....	22,679	55.5	29.3	26.2	17,502	60.8	33.8	27.0	3,589	62.4	44.9	17.4	422	68.7	41.0	27.7	6	100.0	100.0	0.0
1999 .....	20,871	63.0	28.4	34.6	16,559	66.8	32.0	34.8	2,697	71.7	48.5	23.2	369	80.5	45.5	35.0	10	90.0	60.0	30.0
<b>Chemistry</b>																				
1988 .....	14,087	31.4	21.2	10.2	10,626	35.6	24.8	10.8	2,707	33.1	26.6	6.5	276	45.7	34.4	11.2	47	42.6	38.3	4.3
1994 .....	14,609	40.2	24.4	15.8	11,386	43.1	27.4	15.7	2,760	49.5	35.5	13.9	399	60.2	45.4	14.8	66	57.6	50.0	7.6
1999 .....	13,869	46.3	26.1	20.2	11,335	47.5	28.2	19.3	2,076	59.3	38.4	20.9	378	74.9	55.6	19.3	41	80.0	68.3	12.2
<b>Earth and space sciences</b>																				
1988 .....	8,887	49.8	32.9	16.9	6,483	55.3	38.4	16.8	896	68.9	58.1	10.7	766	70.4	43.7	26.6	180	60.0	55.0	5.0
1994 .....	10,983	59.8	34.0	25.7	8,270	63.6	38.3	25.3	1,169	72.5	52.4	20.1	941	80.7	45.3	35.4	179	69.3	60.3	8.9
1999 .....	12,133	68.0	34.1	33.9	9,316	71.4	38.8	32.6	1,168	84.8	56.5	28.3	1467	84.0	36.5	47.6	224	79.0	72.8	6.3
<b>Mathematics</b>																				
1988 .....	4,385	40.0	20.3	19.7	4,086	41.3	21.2	20.1	236	57.2	43.6	13.6	83	65.1	44.6	20.5	4	75.0	75.0	0.0
1994 .....	3,620	46.9	22.7	24.2	3,440	47.6	23.4	24.2	163	74.2	56.4	17.8	69	73.9	46.4	27.5	5	60.0	60.0	0.0
1999 .....	3,594	53.6	21.8	31.8	3,406	54.4	22.3	32.1	164	78.0	51.2	26.8	76	76.3	53.9	22.4	5	60.0	60.0	0.0
<b>Clinical medicine</b>																				
1988 .....	56,945	60.8	52.5	8.3	46,095	65.5	57.8	7.7	3,735	65.0	55.4	9.6	11,637	76.9	69.8	7.0	2,011	84.2	78.8	5.4
1994 .....	59,145	64.3	51.2	13.1	47,640	68.5	56.1	12.4	5,557	73.5	58.2	15.3	12,718	79.2	67.9	11.3	1,819	86.5	78.2	8.3
1999 .....	57,965	68.7	50.5	18.2	46,698	72.3	55.4	16.9	5,922	81.1	57.4	23.7	13,201	80.9	65.9	15.1	1,616	87.3	77.1	10.1
<b>Biomedical research</b>																				
1988 .....	28,946	51.9	39.6	12.3	23,819	55.8	44.3	11.5	2,224	62.5	51.1	11.4	3,404	71.9	58.1	13.8	440	68.4	59.3	9.1
1994 .....	32,436	59.8	42.0	17.8	26,945	63.2	46.5	16.7	2,911	71.1	52.0	19.1	4,033	76.4	57.0	19.5	415	78.8	65.1	13.7
1999 .....	31,502	65.5	42.0	23.5	26,657	68.2	46.0	22.2	2,693	75.3	51.8	23.5	4,137	83.5	58.2	25.3	382	81.2	57.3	23.8
<b>Biology</b>																				
1988 .....	14,087	31.4	21.2	10.2	10,626	35.6	24.8	10.8	2,707	33.1	26.6	6.5	276	45.7	34.4	11.2	47	42.6	38.3	4.3
1994 .....	14,609	40.2	24.4	15.8	11,386	43.1	27.4	15.7	2,760	49.5	35.5	13.9	399	60.2	45.4	14.8	66	57.6	50.0	7.6
1999 .....	15,744	52.7	33.0	19.7	11,335	47.5	28.2	19.3	2,076	59.3	38.4	20.9	378	74.9	55.6	19.3	41	80.5	68.3	12.2
<b>Engineering and technology</b>																				
1988 .....	11,990	37.1	26.8	10.3	7,738	44.7	32.8	11.9	3,613	42.6	36.3	6.3	323	55.7	43.7	12.1	55	67.3	58.2	9.1
1994 .....	12,897	44.4	29.7	14.7	8,902	50.5	34.7	15.8	3,685	53.0	43.2	9.8	256	64.1	46.5	17.6	50	76.0	62.0	14.0
1999 .....	10,669	51.4	30.6	20.7	7,760	56.6	35.3	21.3	2,996	64.4	49.1	15.2	177	67.8	48.0	19.8	34	82.4	70.6	11.8

See explanatory notes, if any, and SOURCE at end of table

Appendix table 5-45.

**Incidence of multiple corporate authorship of U.S. scientific and technical articles, by field: 1988, 1994, and 1999**

Years	All Sectors				Academic				Industry				Non-profit				State and local government			
	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored												
	Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles		
<b>Psychology</b>																				
1988 .....	7,090	37.7	32.9	4.8	6,577	39.4	34.6	4.8	224	64.7	59.4	5.4	451	70.7	66.1	4.7	157	74.5	72.0	2.5
1994 .....	6,189	41.8	34.2	7.6	5,731	43.3	35.8	7.6	159	68.6	59.7	8.8	431	76.3	68.4	7.9	154	63.6	56.5	7.1
1999 .....	5,822	47.8	37.2	10.6	5,494	49.1	38.6	10.6	172	72.7	65.1	7.6	404	77.5	70.5	6.9	102	78.4	71.6	6.9
<b>Social sciences</b>																				
1988 .....	8,592	30.5	23.7	6.8	7,448	33.0	26.1	6.9	336	41.4	39.6	1.8	648	47.8	39.2	8.6	74	58.1	56.8	1.4
1994 .....	8,102	33.6	24.1	9.5	7,054	36.0	26.5	9.5	228	49.1	46.9	2.2	722	54.6	40.7	13.9	88	63.6	58.0	5.7
1999 .....	7,322	35.1	24.1	11.1	6,548	36.3	25.7	10.7	210	55.7	46.2	9.5	611	61.7	43.9	17.8	60	71.7	70.0	1.7
<b>Health and professional fields</b>																				
1988 .....	10,778	34.3	30.9	3.4	8,993	38.2	34.5	3.7	1,063	38.0	36.8	1.2	727	52.8	49.8	3.0	292	56.5	55.1	1.4
1994 .....	10,185	36.6	31.6	5.0	8,695	39.9	34.6	5.4	834	43.9	40.6	3.2	705	56.0	52.3	3.7	271	58.7	56.5	2.2
1999 .....	8,959	40.0	33.5	6.5	7,878	42.6	35.9	6.7	659	54.8	49.9	4.9	712	65.9	61.1	4.8	226	77.4	73.0	4.4

See explanatory notes, if any, and SOURCE at end of table

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Appendix table 5-45.

**Incidence of multiple corporate authorship of U.S. scientific and technical articles, by field: 1988, 1994, and 1999**

Years	Federal Government				University-administered FFRDCs				Industry-administered FFRDCs				Nonprofit-administered FFRDCs			
	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored
	Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles		
<b>Total science and engineering</b>																
1988 .....	21,893	67.6	57.7	9.9	5,204	63.2	44.4	18.8	1,722	57.5	44.9	12.5	531	46.1	39.9	6.2
1994 .....	22,932	72.9	57.5	15.4	5,813	72.3	43.8	28.5	1,881	71.2	51.5	19.7	673	61.2	45.6	15.6
1999 .....	20,958	78.5	57.0	21.4	6,376	79.5	41.3	38.2	1,908	78.6	51.1	27.5	615	60.3	44.1	16.3
<b>Physics</b>																
1988 .....	1,436	59.1	48.1	10.9	2,639	63.7	42.0	21.7	646	59.1	40.2	18.9	144	39.6	32.6	6.9
1994 .....	1,919	66.9	48.9	18.0	2,944	71.6	38.6	33.1	670	74.6	46.6	28.1	182	50.0	31.9	18.1
1999 .....	1,766	74.3	48.2	26.2	3,116	78.8	35.7	43.0	689	79.7	46.2	33.5	215	52.6	33.5	19.1
<b>Chemistry</b>																
1988 .....	995	48.4	38.4	10.1	454	65.0	49.3	15.6	194	52.6	44.3	8.2	68	26.5	19.1	7.4
1994 .....	1051	57.3	43.5	13.8	423	73.5	51.8	21.7	229	68.1	58.5	9.6	65	43.1	30.8	12.3
1999 .....	813	65.9	46.1	19.8	609	80.0	52.9	27.1	248	72.2	57.3	14.9	134	50.7	37.3	13.4
<b>Earth and space sciences</b>																
1988 .....	1,781	62.8	49.1	13.8	818	68.6	46.7	21.9	72	59.7	52.8	6.9	45	73.3	64.4	8.9
1994 .....	2,326	76.9	52.4	24.5	1,093	77.4	46.2	31.2	83	63.9	56.6	7.2	66	81.8	65.2	16.7
1999 .....	2,547	81.7	51.0	30.6	1,423	83.7	41.6	42.1	87	78.2	60.9	17.2	76	84.2	65.8	18.4
<b>Mathematics</b>																
1988 .....	126	52.4	44.4	7.9	55	63.6	56.4	7.3	25	56.0	44.0	12.0	7	57.1	42.9	14.3
1994 .....	78	64.1	52.6	11.5	39	69.2	48.7	20.5	22	45.5	45.5	0.0	5	40.0	40.0	0.0
1999 .....	85	54.1	41.2	12.9	43	74.4	39.5	34.9	13	69.2	53.8	15.4	0	na	na	na
<b>Clinical medicine</b>																
1988 .....	8,942	79.9	70.6	9.3	186	72.6	62.4	10.2	163	70.6	56.4	41.1	35	82.9	74.3	8.6
1994 .....	8,477	82.9	68.6	14.3	210	81.0	64.3	16.7	177	85.9	59.9	26.0	70	72.9	65.7	7.1
1999 .....	7,805	86.1	66.0	20.1	177	90.4	63.3	27.1	202	86.6	51.5	35.1	33	90.9	72.7	18.2
<b>Biomedical research</b>																
1988 .....	3,749	67.9	54.2	13.7	371	60.6	44.7	15.9	199	65.8	56.8	9.0	49	38.8	34.7	4.1
1994 .....	4,094	74.6	55.1	19.6	375	79.2	54.9	24.3	295	75.6	53.9	21.7	60	75.0	50.0	25.0
1999 .....	3,718	79.0	53.6	25.4	408	85.5	53.7	31.9	297	82.5	53.9	28.6	52	69.2	59.6	9.6
<b>Biology</b>																
1988 .....	995	48.4	38.4	10.1	454	65.0	49.3	15.6	194	52.6	44.3	8.2	68	26.5	19.1	7.4
1994 .....	1,051	57.3	43.5	13.8	423	73.5	51.8	21.7	229	68.1	58.5	9.6	65	43.1	30.8	12.3
1999 .....	813	65.9	46.1	19.8	609	80.0	52.9	27.1	248	72.2	57.3	14.9	134	50.7	37.3	13.4
<b>Engineering and technology</b>																
1988 .....	1,020	54.7	48.4	6.3	578	51.9	40.5	11.4	336	47.0	38.7	8.3	100	51.0	44.0	7.0
1994 .....	1,142	63.0	53.2	9.8	611	59.2	43.0	16.2	347	57.9	46.4	11.5	136	61.0	41.2	19.9
1999 .....	1,006	68.7	56.1	12.6	547	64.4	41.3	23.0	308	75.0	50.3	24.7	85	54.1	41.2	12.9

See explanatory notes, if any, and SOURCE at end of table

Appendix table 5-45.

**Incidence of multiple corporate authorship of U.S. scientific and technical articles, by field: 1988, 1994, and 1999**

Years	Federal Government				University-administered FFRDCs				Industry-administered FFRDCs				Nonprofit-administered FFRDCs			
	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored	Total articles	Total coauthored	U.S.- coauthored	Internationally coauthored
	Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles			Number	Percent of total articles		
<b>Psychology</b>																
1988 .....	325	71.1	66.8	4.3	2	100.0	100.0	0.0	0	na	na	na	8	62.5	62.5	0.0
1994 .....	277	71.5	64.6	6.9	8	75.0	62.5	12.5	0	na	na	na	5	80.0	80.0	0.0
1999 .....	262	81.7	71.8	9.9	0	na	na	na	1	100.0	100.0	0.0	1	0.0	0.0	0.0
<b>Social sciences</b>																
1988 .....	545	44.0	39.3	4.8	42	47.6	38.1	9.5	2	50.0	50.0	0.0	29	31.0	31.0	0.0
1994 .....	537	43.0	37.1	6.0	34	44.1	32.4	11.8	4	75.0	75.0	0.0	36	58.3	44.4	13.9
1999 .....	369	52.6	43.9	8.7	11	81.8	36.4	45.5	10	60.0	50.0	10.0	4	25.0	25.0	0.0
<b>Health and professional fields</b>																
1988 .....	491	49.5	46.6	2.9	12	75.0	75.0	0.0	1	0.0	0.0	0.0	31	41.9	41.9	0.0
1994 .....	467	54.8	51.0	3.9	6	66.7	66.7	0.0	0	na	na	na	29	69.0	69.0	0.0
1999 .....	384	67.7	59.9	7.8	6	50.0	50.0	0.0	4	75.0	75.0	0.0	6	83.3	83.3	0.0

FFRDCs = Federally Funded Research and Development Centers. na = not applicable.

NOTES: Coauthorships are based on authors' corporate addresses. Sectoral tables do not add to totals because articles are on a whole count basis, where each sector receives a whole count for a multi-authored publications. The whole counting of publications, where each sector and/or country receives an entire count in multiauthored papers, results in higher counts compared to the fractional basis of counting found in other tables.

SOURCES: Institute for Scientific Information, Science Citation Index and Social Science Citation Index; CHI Research, Inc., Science Indicators database; and National Science Foundation.

Appendix table 5-46

**Patterns of cross-sectoral coauthorship of U.S. scientific and technical articles, by sector and field: 1988 and 1999**

Years	Cross-sectoral authored articles (number)	Academic Sector						
		Percent of cross-sectoral coauthorships with:						
		Industry	Federal Govt.	University FFRDC	Industry FFRDC	Nonprofit FFRDC	Other govt.	Nonprofit
<b>Total science and engineering</b>								
1988 .....	30,160	20.3	35.0	7.3	2.0	0.5	7.2	34.6
1999 .....	35,535	24.9	32.1	9.5	2.6	0.7	5.6	35.7
<b>Physics</b>								
1988 .....	2,945	36.5	7.3	39.0	8.0	1.0	0.0	5.0
1999 .....	3,786	29.7	7.3	42.0	10.0	2.0	0.1	5.1
<b>Chemistry</b>								
1988 .....	1,116	47.6	7.5	18.0	7.0	1.0	0.3	6.3
1999 .....	1,568	43.8	5.4	22.0	8.0	3.0	0.3	7.8
<b>Earth and space sciences</b>								
1988 .....	1,630	22.5	19.1	23.0	2.0	1.0	2.1	20.2
1999 .....	3,059	18.5	20.6	27.0	2.0	2.0	1.9	24.7
<b>Mathematics</b>								
1998 .....	224	42.0	24.1	13.0	6.0	1.0	1.3	16.5
1999 .....	194	47.9	13.4	9.0	4.0	0.0	1.0	25.8
<b>Clinical medicine</b>								
1988 .....	14,190	10.9	38.5	0.7	0.3	0.1	9.7	47.8
1999 .....	15,131	20.2	32.7	0.8	0.5	0.1	7.5	50.8
<b>Biomedical research</b>								
1988 .....	4,580	19.3	12.8	3.0	2.0	0.0	1.9	41.6
1999 .....	5,858	22.2	11.1	4.0	2.0	1.0	1.3	43.5
<b>Biology</b>								
1988 .....	1,116	47.6	25.5	18.0	7.0	1.0	1.1	6.3
1999 .....	1,568	43.8	18.7	22.0	8.0	3.0	1.1	7.8
<b>Engineering and technology</b>								
1988 .....	1,490	56.8	22.8	12.0	6.0	2.0	1.7	6.4
1999 .....	1,902	63.7	21.0	10.0	7.0	1.0	0.8	3.3
<b>Psychology</b>								
1988 .....	806	14.1	25.9	0.0	0.0	1.0	12.9	35.9
1999 .....	642	17.0	28.8	0.0	0.0	0.0	11.7	43.3
<b>Social sciences</b>								
1988 .....	589	19.0	29.4	2.0	0.0	1.0	5.8	38.7
1999 .....	537	15.8	26.8	1.0	1.0	0.0	5.8	48.2
<b>Health and professional fields</b>								
1988 .....	969	29.9	16.3	1.0	0.0	1.0	13.3	30.7
1999 .....	963	27.6	20.4	0.0	0.0	1.0	14.7	39.8

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-46

**Patterns of cross-sectoral coauthorship of U.S. scientific and technical articles, by sector and field: 1988 and 1999**

Years	Cross-sectoral authored articles (number)	Industry Sector						
		Percent of cross-sectoral coauthorships with:						
		Federal Govt.	University FFRDC	Industry FFRDC	Nonprofit FFRDC	Other govt.	Nonprofit	
<b>Total science and engineering</b>								
1988 .....	7,609	80.5	17.1	4.1	1.9	0.6	2.1	10.7
1999 .....	10,755	82.1	17.3	4.1	2.2	0.6	2.4	16.3
<b>Physics</b>								
1988 .....	1,335	57.7	9.5	13.0	4.0	1.0	0.1	1.6
1999 .....	1,422	58.2	13.1	14.0	6.0	1.0	0.0	1.7
<b>Chemistry</b>								
1988 .....	638	59.2	9.7	4.0	2.0	1.0	0.1	3.6
1999 .....	814	55.8	8.9	3.0	3.0	1.0	0.3	3.3
<b>Earth and space sciences</b>								
1988 .....	542	59.6	33.2	9.4	0.2	0.9	3.7	7.7
1999 .....	818	57.1	33.5	11.4	0.9	1.8	4.2	8.2
<b>Mathematics</b>								
1988 .....	108	87.0	4.6	4.0	1.0	1.0	0.0	8.3
1999 .....	100	93.0	8.0	5.0	1.0	0.0	0.0	3.0
<b>Clinical medicine</b>								
1988 .....	1,913	80.7	19.0	0.2	0.9	0.3	4.0	21.7
1999 .....	3,706	82.5	15.8	0.2	0.6	0.1	3.7	30.3
<b>Biomedical research</b>								
1988 .....	1,090	63.7	14.5	2.0	2.0	0.0	1.1	16.4
1999 .....	1,528	64.0	12.0	2.0	2.0	1.0	1.1	21.5
<b>Biology</b>								
1988 .....	638	83.2	13.6	4.0	2.0	1.0	6.2	3.6
1999 .....	814	84.4	13.5	3.0	3.0	1.0	0.5	3.3
<b>Engineering and technology</b>								
1988 .....	1,065	79.5	13.4	4.0	3.0	1.0	0.6	5.7
1999 .....	1,442	84.0	13.1	5.0	4.0	1.0	0.8	2.5
<b>Psychology</b>								
1988 .....	134	85.1	8.2	0.0	0.0	1.0	3.7	6.7
1999 .....	119	91.6	10.1	0.0	0.0	0.0	3.4	24.4
<b>Social sciences</b>								
1988 .....	129	86.8	10.1	1.0	0.0	1.0	3.1	9.3
1999 .....	100	85.0	8.0	1.0	0.0	0.0	5.0	13.0
<b>Health and professional fields</b>								
1988 .....	337	86.1	6.8	1.0	0.0	0.0	3.0	8.0
1999 .....	306	86.9	10.8	0.0	0.0	0.0	4.2	20.3

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-46

**Patterns of cross-sectoral coauthorship of U.S. scientific and technical articles, by sector and field: 1988 and 1999**

Years	Cross-sectoral authored articles (number)	Federal Government						
		Percent of cross-sectoral coauthorships with:						
		Academia	Industry	University FFRDC	Industry FFRDC	Nonprofit FFRDC	Other govt.	
<b>Total science and engineering</b>								
1988 .....	12,024	87.9	10.8	2.0	1.1	0.3	3.3	10.4
1999 .....	13,150	86.9	14.2	3.7	1.8	0.3	3.4	13.6
<b>Physics</b>								
1988 .....	713	64.4	24.7	10.0	3.0	1.0	0.1	3.2
1999 .....	1,020	61.4	24.9	10.0	4.0	1.0	0.1	2.7
<b>Chemistry</b>								
1988 .....	368	59.1	23.6	2.0	2.0	1.0	0.6	3.8
1999 .....	401	54.7	27.4	5.0	2.0	0.0	0.6	3.7
<b>Earth and space sciences</b>								
1988 .....	913	61.2	22.5	10.0	2.0	1.0	1.4	10.2
1999 .....	1,695	65.9	19.6	17.0	1.0	1.0	1.5	13.8
<b>Mathematics</b>								
1988 .....	58	93.1	8.6	2.0	0.0	0.0	1.7	3.4
1999 .....	33	78.8	24.2	3.0	0.0	0.0	3.0	6.1
<b>Clinical medicine</b>								
1988 .....	5,900	92.7	6.2	0.3	0.6	0.2	4.2	13.0
1999 .....	5,477	90.3	10.7	0.4	1.3	0.2	5.0	19.2
<b>Biomedical research</b>								
1988 .....	1,954	66.8	10.3	1.0	2.0	0.0	1.4	12.1
1999 .....	2,246	68.9	10.9	1.0	3.0	0.0	1.7	13.1
<b>Biology</b>								
1988 .....	368	77.4	23.6	2.0	2.0	1.0	0.8	3.8
1999 .....	401	73.1	27.4	5.0	2.0	0.0	0.7	3.7
<b>Engineering and technology</b>								
1988 .....	466	72.7	30.7	3.0	1.0	0.0	0.6	3.9
1999 .....	561	71.3	33.7	5.0	5.0	1.0	0.5	2.0
<b>Psychology</b>								
1988 .....	219	95.4	5.0	0.0	0.0	0.0	4.1	4.6
1999 .....	191	96.9	6.3	0.0	0.0	0.0	2.6	9.9
<b>Social sciences</b>								
1988 .....	197	87.8	6.6	2.0	0.0	1.0	3.0	10.7
1999 .....	164	87.8	4.9	0.0	1.0	0.0	0.6	17.7
<b>Health and professional fields</b>								
1988 .....	205	77.1	11.2	1.0	0.0	1.0	10.7	12.7
1999 .....	229	85.6	14.4	0.0	0.0	1.0	12.7	20.1

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-46

**Patterns of cross-sectoral coauthorship of U.S. scientific and technical articles, by sector and field: 1988 and 1999**

Years	Cross-sectoral authored articles (number)	Academic FFRDCs					
		Percent of cross-sectoral coauthorships with:					
		Academia	Industry	Federal Govt.	Industry FFRDC	Nonprofit FFRDC	Other govt.
<b>Total science and engineering</b>							
1988 .....	2,578	85.8	12.1	9.2	4.0	0.8	0.3
1999 .....	3,850	87.8	11.3	12.8	4.4	1.2	0.2
<b>Physics</b>							
1988 .....	1,310	87.6	12.7	5.3	5.0	0.0	0.1
1999 .....	1,778	65.5	10.9	4.3	6.0	1.0	0.0
<b>Chemistry</b>							
1988 .....	218	92.2	10.6	2.8	2.0	1.0	0.0
1999 .....	375	69.2	7.5	3.7	4.0	2.0	0.0
<b>Earth and space sciences</b>							
1988 .....	449	82.0	11.4	20.9	1.0	1.0	0.7
1999 .....	972	69.6	9.6	23.4	1.0	1.0	0.3
<b>Mathematics</b>							
1988 .....	33	84.8	12.1	3.0	0.0	0.0	0.0
1999 .....	20	85.0	25.0	5.0	0.0	0.0	0.0
<b>Clinical medicine</b>							
1988 .....	120	87.5	3.3	16.7	4.0	1.0	3.0
1999 .....	130	89.2	6.9	16.9	4.0	0.0	2.3
<b>Biomedical research</b>							
1988 .....	174	83.9	10.3	14.9	3.0	2.0	0.6
1999 .....	277	71.1	10.8	9.2	1.0	1.0	0.0
<b>Biology</b>							
1988 .....	218	92.2	10.6	2.8	2.0	1.0	0.0
1999 .....	375	89.9	7.5	4.8	4.0	2.0	0.0
<b>Engineering and technology</b>							
1988 .....	221	77.4	17.6	7.2	8.0	3.0	0.0
1999 .....	263	73.8	27.4	10.3	11.0	2.0	0.0
<b>Psychology</b>							
1988 .....	2	100.0	0.0	0.0	0.0	0.0	0.0
1999 .....	0	na	na	na	na	na	na
<b>Social sciences</b>							
1988 .....	16	87.5	6.3	18.8	0.0	0.0	0.0
1999 .....	4	75.0	25.0	0.0	0.0	0.0	0.0
<b>Health and professional fields</b>							
1988 .....	9	77.8	22.2	11.1	0.0	0.0	0.0
1999 .....	3	100.0	33.3	33.3	0.0	0.0	33.3

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-46

**Patterns of cross-sectoral coauthorship of U.S. scientific and technical articles, by sector and field: 1988 and 1999**

Years	Cross-sectoral authored articles (number)	Industry FFRDCs					
		Percent of cross-sectoral coauthorships with:					
		Academia	Industry	Federal Govt.	University FFRDC	Nonprofit FFRDC	Other govt.
<b>Total science and engineering</b>							
1988 .....	825	72.2	17.3	16.6	12.6	1.1	0.2
1999 .....	1,223	75.7	19.4	18.9	13.7	1.5	0.7
<b>Physics</b>							
1988 .....	318	64.9	16.4	6.0	21.0	1.0	0.0
1999 .....	460	69.0	18.9	7.3	22.0	1.0	0.0
<b>Chemistry</b>							
1988 .....	88	70.6	17.0	5.9	6.0	0.0	0.0
1999 .....	156	72.6	14.1	5.0	8.0	6.0	0.0
<b>Earth and space sciences</b>							
1988 .....	36	55.8	2.8	37.2	11.0	3.0	2.3
1999 .....	60	70.6	11.7	13.2	22.0	0.0	2.9
<b>Mathematics</b>							
1988 .....	13	100.0	7.7	0.0	0.0	0.0	0.0
1999 .....	7	100.0	14.3	0.0	0.0	0.0	0.0
<b>Clinical medicine</b>							
1988 .....	81	55.6	21.0	44.4	6.2	0.0	0.0
1999 .....	123	56.1	18.7	59.3	4.1	0.0	1.6
<b>Biomedical research</b>							
1988 .....	119	55.0	18.5	32.1	4.0	1.0	0.0
1999 .....	191	52.7	18.8	26.9	2.0	2.0	1.6
<b>Biology</b>							
1988 .....	88	81.8	17.0	6.8	6.0	0.0	0.0
1999 .....	156	83.3	14.1	5.8	8.0	2.0	0.0
<b>Engineering and technology</b>							
1988 .....	127	66.1	25.2	4.7	13.0	4.0	0.0
1999 .....	187	68.4	31.6	14.4	16.0	4.0	0.0
<b>Psychology</b>							
1988 .....	0	na	na	na	na	na	na
1999 .....	1	100.0	0.0	0.0	0.0	0.0	0.0
<b>Social sciences</b>							
1988 .....	1	100.0	0.0	0.0	0.0	0.0	0.0
1999 .....	5	100.0	0.0	40.0	0.0	0.0	20.0
<b>Health and professional fields</b>							
1988 .....	0	na	na	na	na	na	na
1999 .....	3	100.0	33.3	0.0	0.0	0.0	0.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-46

**Patterns of cross-sectoral coauthorship of U.S. scientific and technical articles, by sector and field: 1988 and 1999**

Years	Cross-sectoral authored articles (number)	Nonprofit FFRDCs					
		Percent of cross-sectoral coauthorships with:					
		Academia	Industry	Federal Govt.	University FFRDC	Industry FFRDC	Other govt.
<b>Total science and engineering</b>							
1988 .....	2,494	86.8	6.3	15.8	0.1	0.0	0.0
1999 .....	2,312	85.8	10.9	19.4	0.4	0.1	0.0
<b>Physics</b>							
1988 .....	4	75.0	25.0	25.0	25.0	0.0	0.0
1999 .....	9	100.0	0.0	11.1	0.0	0.0	0.0
<b>Chemistry</b>							
1988 .....	13	60.0	7.7	15.0	0.0	0.0	0.0
1999 .....	28	54.5	14.3	9.1	0.0	0.0	0.0
<b>Earth and space sciences</b>							
1988 .....	102	69.4	22.5	14.8	3.0	1.0	0.0
1999 .....	168	70.6	25.0	18.1	2.0	1.0	0.0
<b>Mathematics</b>							
1988 .....	3	100.0	0.0	33.3	0.0	0.0	0.0
1999 .....	3	66.7	0.0	33.3	0.0	0.0	0.0
<b>Clinical medicine</b>							
1988 .....	1,555	88.4	5.0	16.1	0.0	0.1	0.0
1999 .....	1,296	87.3	10.6	21.1	0.2	0.0	0.0
<b>Biomedical research</b>							
1988 .....	276	83.1	5.4	12.0	0.0	0.0	0.0
1999 .....	268	76.5	8.6	15.8	0.0	2.0	1.0
<b>Biology</b>							
1988 .....	13	92.3	7.7	23.1	0.0	0.0	0.0
1999 .....	28	64.3	14.3	10.7	0.0	0.0	0.0
<b>Engineering and technology</b>							
1988 .....	36	69.4	16.7	8.3	0.0	0.0	0.0
1999 .....	27	59.3	44.4	11.1	0.0	0.0	0.0
<b>Psychology</b>							
1988 .....	113	92.0	4.4	8.0	0.0	0.0	0.0
1999 .....	78	96.2	5.1	6.4	0.0	0.0	0.0
<b>Social sciences</b>							
1988 .....	41	82.9	0.8	14.6	0.0	0.0	0.0
1999 .....	41	75.6	12.2	2.4	0.0	0.0	0.0
<b>Health and professional fields</b>							
1988 .....	159	81.1	6.3	13.8	0.0	0.0	0.0
1999 .....	162	87.7	8.0	17.9	1.0	0.0	0.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-46

**Patterns of cross-sectoral coauthorship of U.S. scientific and technical articles, by sector and field: 1988 and 1999**

Years	Cross-sectoral authored articles (number)	Other government					
		Percent of cross-sectoral coauthorships with:					
		Academia	Industry	Federal Govt.	University FFRDC	Industry FFRDC	Nonprofit FFRDC
<b>Total science and engineering</b>							
1988 .....	2,494	86.8	6.3	15.8	0.1	0.0	0.0
1999 .....	2,312	85.8	10.9	19.4	0.4	0.1	0.0
<b>Physics</b>							
1988 .....	4	75.0	25.0	25.0	25.0	0.0	0.0
1999 .....	9	100.0	0.0	11.1	0.0	0.0	0.0
<b>Chemistry</b>							
1988 .....	13	60.0	7.7	15.0	0.0	0.0	0.0
1999 .....	28	54.5	14.3	9.1	0.0	0.0	0.0
<b>Earth and space sciences</b>							
1988 .....	102	69.4	22.5	14.8	3.0	1.0	0.0
1999 .....	168	70.6	25.0	18.1	2.0	1.0	0.0
<b>Mathematics</b>							
1988 .....	3	100.0	0.0	33.3	0.0	0.0	0.0
1999 .....	3	66.7	0.0	33.3	0.0	0.0	0.0
<b>Clinical medicine</b>							
1988 .....	1,555	88.4	5.0	16.1	0.0	0.1	0.0
1999 .....	1,296	87.3	10.6	21.1	0.2	0.0	0.0
<b>Biomedical research</b>							
1988 .....	276	83.1	5.4	12.0	0.0	0.0	0.0
1999 .....	268	76.5	8.6	15.8	0.0	2.0	1.0
<b>Biology</b>							
1988 .....	13	92.3	7.7	23.1	0.0	0.0	0.0
1999 .....	28	64.3	14.3	10.7	0.0	0.0	0.0
<b>Engineering and technology</b>							
1988 .....	36	69.4	16.7	8.3	0.0	0.0	0.0
1999 .....	27	59.3	44.4	11.1	0.0	0.0	0.0
<b>Psychology</b>							
1988 .....	113	92.0	4.4	8.0	0.0	0.0	0.0
1999 .....	78	96.2	5.1	6.4	0.0	0.0	0.0
<b>Social sciences</b>							
1988 .....	41	82.9	0.8	14.6	0.0	0.0	0.0
1999 .....	41	75.6	12.2	2.4	0.0	0.0	0.0
<b>Health and professional fields</b>							
1988 .....	159	81.1	6.3	13.8	0.0	0.0	0.0
1999 .....	162	87.7	8.0	17.9	1.0	0.0	0.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-46

**Patterns of cross-sectoral coauthorship of U.S. scientific and technical articles, by sector and field: 1988 and 1999**

Years	Cross-sectoral authored articles (number)	Nonprofit						Other govt.	
		Percent of cross-sectoral coauthorships with:							
		Academia	Industry	Federal Govt.	University FFRDC	Industry FFRDC	Nonprofit FFRDC		
<b>Total science and engineering</b>									
1988 .....	11,441	91.2	7.1	10.9	1.0	0.1	0.0	3.7	
1999 .....	14,059	90.4	12.5	12.8	2.0	1.0	0.0	3.3	
<b>Physics</b>									
1988 .....	187	64.0	11.8	10.1	8.0	1.0	1.0	0.0	
1999 .....	232	65.0	10.3	9.4	14.0	5.0	0.0	0.0	
<b>Chemistry</b>									
1988 .....	100	55.6	23.0	11.1	2.0	0.0	1.0	0.8	
1999 .....	169	43.1	16.0	5.3	1.0	2.0	1.0	2.1	
<b>Earth and space sciences</b>									
1988 .....	413	61.2	10.2	17.3	14.0	1.0	1.0	1.1	
1999 .....	908	61.4	7.4	19.0	21.0	0.0	0.0	0.5	
<b>Mathematics</b>									
1988 .....	43	86.0	20.9	4.7	2.0	0.0	0.0	0.0	
1999 .....	51	98.0	5.9	3.9	2.0	0.0	0.0	2.0	
<b>Clinical medicine</b>									
1988 .....	7,266	93.4	18.8	10.5	0.1	0.1	0.0	4.5	
1999 .....	8,408	91.4	19.1	12.5	0.2	0.1	0.0	3.9	
<b>Biomedical research</b>									
1988 .....	2,083	77.7	8.6	9.7	1.0	1.0	0.0	2.1	
1999 .....	2,782	73.8	11.8	8.5	2.0	1.0	0.0	1.6	
<b>Biology</b>									
1988 .....	100	70.0	23.0	14.0	2.0	0.0	1.0	1.0	
1999 .....	169	72.2	16.0	8.9	1.0	2.0	1.0	3.6	
<b>Engineering and technology</b>									
1988 .....	157	61.1	38.9	11.5	6.0	4.0	0.0	0.6	
1999 .....	100	63.0	36.0	11.0	3.0	3.0	1.0	1.0	
<b>Psychology</b>									
1988 .....	304	95.1	3.0	3.3	0.0	0.0	0.0	3.6	
1999 .....	294	94.6	9.9	6.5	0.0	0.0	0.0	2.7	
<b>Social sciences</b>									
1988 .....	252	90.5	4.8	8.3	0.0	0.0	0.0	1.2	
1999 .....	284	91.2	4.6	10.2	0.0	0.0	0.0	1.1	
<b>Health and professional fields</b>									
1988 .....	347	85.6	7.8	7.5	0.0	0.0	0.0	4.9	
1999 .....	425	90.1	14.6	10.8	0.0	0.0	0.0	7.5	

na = not applicable; FFRDC = Federally Funded Research and Development Center

NOTES: Counts are on a whole count basis; for example, an article with two authors in two sectors is counted as an article in each sector. Because of whole counts, sector shares exceed 100% in fields where there are articles with more than two sectoral authors.

SOURCES: Institute for Scientific Information, Science Citation and Social Science Citation Index; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

Appendix table 5-47.

**Breadth of international coauthorship ties for selected countries: 1986 and 1999**

Country/economy	Collaborating countries		Country/economy	Collaborating countries	
	1986	1999		1986	1999
United States	124	160	Venezuela	19	49
United Kingdom	103	144	Singapore	29	49
France	93	141	Malaysia	15	49
Germany	84	133	Tanzania	15	48
Japan	64	119	Morocco	13	47
Canada	81	115	Ethiopia	15	46
Netherlands	64	114	Nigeria	33	45
Australia	64	113	Pakistan	29	45
Italy	56	112	Peru	14	44
Sweden	67	112	Cameroon	5	44
Belgium	58	109	Bangladesh	14	44
Switzerland	63	109	Iran	14	43
India	73	101	Cuba	15	42
Brazil	50	94	Zimbabwe	12	42
Denmark	49	93	Vietnam	8	42
Spain	46	93	Yugoslavia	42	41
China	39	88	Tunisia	16	40
Finland	40	87	Iceland	10	40
Russia	na	86	Costa Rica	15	38
South Africa	39	81	Algeria	16	38
Austria	41	80	Jordan	11	37
Norway	41	80	Lebanon	5	37
Mexico	42	78	Estonia	na	37
Chile	30	77	Byelarus	na	36
South Korea	18	75	Uganda	6	35
Poland	45	73	Kuwait	19	35
Israel	35	71	Cyprus	2	35
Hungary	41	70	Lithuania	na	34
Thailand	32	70	Uzbekistan	na	33
Kenya	35	69	Latvia	na	32
New Zealand	39	69	Ecuador	12	31
Ireland	38	68	Uruguay	7	31
Portugal	19	65	Georgia	na	31
Turkey	21	65	Sri Lanka	16	31
Czech Republic	na	65	Nepal	6	30
Greece	33	64	Bolivia	6	29
Bulgaria	28	64	Jamaica	20	28
Indonesia	21	63	Côte d'Ivoire	9	28
Argentina	36	61	Ghana	11	28
Egypt	50	61	Kazakhstan	na	28
Ukraine	na	59	Guatemala	4	27
Romania	26	58	Zambia	16	27
Slovenia	na	56	Syria	7	24
Philippines	33	56	Panama	7	23
Hong Kong	7	54	Zaire	12	23
Colombia	23	53	Moldova	na	22
Croatia	na	53	Libya	1	21
Slovakia	na	53	Dominican Republic	6	20
Saudia Arabia	23	52	Papua New Guinea	5	20
Taiwan	18	52	Mozambique	4	17

na = not applicable

NOTE: Data are number of countries that have jointly authored papers (based on institutional address) with indicated countries.

SOURCES: Institute for Scientific Information, Science Citation and Social Science Citation Indexes; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

**Appendix table 5-48.**  
**U.S. international scientific collaboration: 1986 and 1999**

Region/country or economy	1999			1986		
	Total scientific articles (Number)	Internationally authored articles (Number)	U.S. share of internationally authored articles (Percentage share)	Total scientific articles (Number)	Internationally authored articles (Number)	U.S. share of internationally authored articles (Percentage share)
<b>North America</b>						
Canada .....	24,498	8,665	51.2	23,207	4,375	53.3
United States .....	183,906	39,669	na	186,792	17,187	na
<b>Latin America</b>						
Antigua and Barbuda .....	0	0	na	0	0	na
Argentina .....	2,974	1,120	30.4	1,584	234	44.0
Bahamas .....	3	3	100.0	6	5	100.0
Barbados .....	22	12	50.0	24	8	12.5
Belize .....	5	5	100.0	2	2	50.0
Bolivia .....	70	62	19.4	13	12	33.3
Brazil .....	6,533	2,501	39.7	2,099	594	37.9
Chile .....	1,263	659	34.6	793	214	46.7
Colombia .....	367	256	37.9	127	64	45.3
Costa Rica .....	128	100	45.0	62	32	65.6
Cuba .....	308	204	7.8	76	37	2.7
Dominica .....	0	0	na	0	0	na
Dominican Republic .....	19	19	89.5	18	15	86.7
Ecuador .....	53	50	58.0	16	10	30.0
El Salvador .....	1	1	0.0	2	1	100.0
Grenada .....	3	3	66.7	0	0	na
Guatemala.....	38	38	73.7	22	6	83.3
Guyana .....	9	8	37.5	6	2	0.0
Haiti .....	2	2	100.0	10	10	80.0
Honduras .....	18	12	50.0	5	2	100.0
Jamaica .....	76	51	60.8	76	33	42.4
Mexico .....	3,095	1,418	43.3	1,037	310	56.1
Nicaragua.....	19	19	42.1	5	3	33.3
Panama .....	77	64	60.9	43	28	82.1
Paraguay .....	8	6	33.3	10	7	14.3
Peru .....	119	105	50.5	81	49	67.3
St. Kitts and Nevis .....	1	0	na	0	0	na
St. Lucia .....	1	1	0.0	0	0	na
St. Vincent .....	0	0	na	0	0	na
Suriname .....	7	7	57.1	0	0	na
Trinidad-Tobago .....	52	27	33.3	55	13	23.1
Uruguay .....	245	172	25.6	36	11	36.4
Venezuela .....	641	331	39.0	372	120	48.3
West Indies Associated States ....	9	7	71.4	7	5	20.0
<b>Sub-Saharan Africa</b>						
Angola .....	9	8	12.5	0	0	na
Benin .....	36	27	14.8	0	0	na
Botswana .....	58	30	23.3	27	4	50.0
Burkina Faso .....	51	45	13.3	24	16	18.8
Burundi .....	7	7	0.0	6	3	33.3
Cameroon .....	109	80	16.3	26	19	21.1
Cape Verde Islands .....	2	2	0.0	0	0	na
Central African Republic .....	9	8	12.5	8	6	50.0
Chad Republic .....	3	2	0.0	1	0	na
Comoros .....	0	0	na	0	0	na
Congo, Democratic Republic (Zaire) .....	21	21	61.9	53	41	41.5
Congo, Republic .....	27	25	36.0	22	12	0.0
Cote Ivoire .....	75	58	12.1	61	30	16.7
Equatorial Guinea .....	2	2	0.0	0	0	na
Eritrea .....	5	5	40.0	0	0	na
Ethiopia .....	147	90	17.8	54	15	13.3
Gabon Republic .....	41	33	9.1	21	9	0.0
Gambia .....	43	39	17.9	0	0	na
Ghana .....	120	77	37.7	36	19	15.8
Guinea Republic .....	6	6	16.7	2	2	0.0
Guinea-Bissau .....	16	16	6.3	1	1	0.0

See explanatory notes, if any, and SOURCE at end of table.

**Appendix table 5-48.**  
**U.S. international scientific collaboration: 1986 and 1999**

Region/country or economy	1999			1986		
	Total scientific articles (Number)	Internationally authored articles (Number)	U.S. share of internationally authored articles (Percentage share)	Total scientific articles (Number)	Internationally authored articles (Number)	U.S. share of internationally authored articles (Percentage share)
<b>Sub-Saharan Africa</b>						
Kenya .....	408	263	37.3	308	131	35.9
Lesotho .....	2	1	0.0	9	5	20.0
Liberia .....	1	0	na	11	9	44.4
Madagascar .....	41	34	32.4	15	9	11.1
Malawi .....	68	53	43.4	30	15	40.0
Mali .....	24	19	15.8	16	7	28.6
Mauritania .....	6	6	16.7	4	2	50.0
Mauritius .....	26	17	23.5	2	0	na
Mozambique .....	27	20	5.0	14	8	12.5
Namibia .....	24	19	5.3	0	0	na
Niger .....	33	22	13.6	15	11	0.0
Nigeria .....	477	149	21.5	1,070	166	33.7
Rwanda .....	8	7	0.0	13	9	0.0
Sao Tome and Principe .....	0	0	na	0	0	na
Senegal Republic .....	123	93	19.4	0	0	na
Senegambia .....	0	0	na	104	62	22.6
Seychelles .....	8	8	62.5	1	1	100.0
Sierra Leone .....	3	1	0.0	14	6	66.7
Somalia .....	0	0	na	12	10	0.0
South Africa .....	2,537	910	31.6	2,839	347	36.6
Sudan .....	76	57	10.5	124	56	19.6
Swaziland .....	9	5	0.0	2	0	na
Tanzania .....	172	134	17.2	109	37	16.2
Togo .....	18	12	8.3	9	6	0.0
Uganda .....	105	75	36.0	28	11	36.4
Zambia .....	50	37	21.6	53	16	31.3
Zimbabwe .....	141	91	37.4	114	28	32.1
<b>Near East and North Africa</b>						
Algeria .....	280	208	1.9	117	64	4.7
Bahrain .....	37	13	7.7	27	6	16.7
Djibouti .....	1	1	0.0	1	1	0.0
Egypt .....	1,447	446	34.3	1,229	288	39.9
Iran .....	719	174	22.4	120	45	42.2
Iraq .....	26	8	12.5	250	50	26.0
Israel .....	6,511	2,636	53.2	5,865	1,604	67.7
Jordan .....	270	120	24.2	145	46	52.2
Kuwait .....	321	112	17.9	262	66	27.3
Lebanon .....	138	67	37.3	119	46	43.5
Libya .....	29	17	11.8	52	17	58.8
Malta .....	26	9	11.1	4	2	0.0
Morocco .....	637	460	5.9	114	71	18.3
North Yemen .....	na	na	na	8	3	33.3
Oman .....	100	45	15.6	4	4	25.0
Qatar .....	26	14	7.1	24	12	33.3
Saudi Arabia .....	635	186	32.8	568	147	35.4
South Yemen .....	na	na	na	1	1	0.0
Syria .....	79	41	17.1	24	15	26.7
Tunisia .....	335	182	7.7	121	80	6.3
United Arab Emirates .....	161	78	17.9	16	7	14.3
Yemen .....	18	12	16.7	na	na	na
<b>Western Europe</b>						
Albania .....	30	20	10.0	0	0	na
Andorra .....	1	1	0.0	0	0	na
Austria .....	4,973	2,369	24.4	2,726	687	26.9
Belgium .....	7,112	3,733	23.5	4,392	1,313	27.6
Bosnia and Hercegovina .....	15	11	27.3	na	na	na
Croatia .....	717	290	24.1	na	na	na
Cyprus .....	83	60	21.7	14	2	0.0
Denmark .....	5,795	2,813	27.9	4,209	1,025	28.0
Finland .....	5,266	2,214	28.1	3,151	589	34.3

See explanatory notes, if any, and SOURCE at end of table.

**Appendix table 5-48.**  
**U.S. international scientific collaboration: 1986 and 1999**

Region/country or economy	1999			1986		
	Total scientific articles (Number)	Internationally authored articles (Number)	U.S. share of internationally authored articles (Percentage share)	Total scientific articles (Number)	Internationally authored articles (Number)	U.S. share of internationally authored articles (Percentage share)
<b>Western Europe</b>						
France .....	35,109	13,905	24.8	23,478	4,932	29.0
Germany (East) .....	na	na	na	4,244	729	4.5
Germany .....	47,714	18,340	29.8	28,916	5,805	34.7
Greece .....	2,966	1,250	30.8	1,359	362	42.0
Iceland .....	208	149	20.8	82	41	36.6
Ireland .....	1,683	753	24.6	909	243	23.9
Italy .....	21,715	8,551	31.9	11,465	2,620	36.0
Liechtenstein .....	20	6	33.3	7	2	0.0
Luxembourg .....	50	33	9.1	12	5	0.0
Macedonia .....	53	31	12.9	na	na	na
Monaco .....	44	34	26.5	19	10	10.0
Netherlands .....	13,712	5,654	29.6	9,253	1,830	29.6
Norway .....	3,542	1,589	28.8	2,598	568	29.2
Portugal .....	2,140	1,129	21.7	460	160	25.0
San Marino .....	1	1	100.0	0	0	na
Slovenia .....	802	352	21.3	na	na	na
Spain .....	15,372	5,569	24.9	5,369	911	29.0
Sweden .....	11,093	4,887	27.1	8,699	1,935	35.7
Switzerland .....	10,284	5,385	31.9	6,751	2,174	32.4
Turkey .....	3,151	704	34.7	454	123	39.8
United Kingdom .....	49,221	16,806	29.3	41,671	6,554	34.8
Vatican City .....	3	3	0.0	7	7	57.1
Yugoslavia .....	663	212	23.6	1,209	368	32.9
<b>Eastern Europe and Central Asia</b>						
Armenia .....	209	106	24.5	na	na	na
Azerbaijan .....	84	32	6.3	na	na	na
Bulgaria .....	1,143	600	14.5	1,302	277	6.1
Byelarus .....	734	296	14.9	na	na	na
Czech Republic .....	2,840	1,444	21.7	na	na	na
Czechoslovakia .....	na	na	na	3,442	591	8.5
Estonia .....	387	216	14.4	na	na	na
Georgia .....	167	88	21.6	na	na	na
Hungary .....	2,859	1,559	27.8	2,280	662	24.6
Kazakhstan .....	136	55	23.6	na	na	na
Kyrgyzstan .....	19	14	71.4	na	na	na
Latvia .....	241	146	11.6	na	na	na
Lithuania .....	329	197	14.7	na	na	na
Moldova .....	140	81	6.2	na	na	na
Poland .....	6,244	2,993	25.3	4,523	967	20.7
Romania .....	1,161	638	17.6	613	95	17.9
Russia .....	19,333	6,451	24.9	na	na	na
Slovakia .....	1,247	626	20.6	na	na	na
Tajikistan .....	23	6	16.7	na	na	na
Turkmenistan .....	1	1	0.0	na	na	na
USSR .....	na	na	na	32,138	1,085	11.5
Ukraine .....	2,913	1,254	15.8	na	na	na
Uzbekistan .....	287	89	16.9	na	na	na
<b>Asia</b>						
Afghanistan .....	0	0	na	5	2	50.0
Bangladesh .....	231	146	31.5	158	63	42.9
Bhutan .....	1	1	0.0	0	0	na
Brunei .....	27	11	18.2	2	1	0.0
Cambodia .....	9	6	0.0	0	0	na
China .....	13,815	3,962	30.0	3,342	779	51.3
Hong Kong .....	2,393	1,053	29.1	92	14	64.3
India .....	10,272	1,894	37.3	10,426	901	37.0
Indonesia .....	276	232	27.6	106	61	26.2
Japan .....	52,711	9,275	42.3	33,278	2,509	55.5
Laos .....	3	2	0.0	0	0	na

See explanatory notes, if any, and SOURCE at end of table.

**Appendix table 5-48.**  
**U.S. international scientific collaboration: 1986 and 1999**

Region/country or economy	1999			1986		
	Total scientific articles (Number)	Internationally authored articles (Number)	U.S. share of internationally authored articles (Percentage share)	Total scientific articles (Number)	Internationally authored articles (Number)	U.S. share of internationally authored articles (Percentage share)
<b>Asia</b>						
Malaysia .....	618	344	9.9	229	78	24.4
Maldives Republic .....	3	1	100.0	0	0	na
Mongolia .....	20	18	44.4	17	13	0.0
Myanmar .....	16	13	23.1	11	4	50.0
Nepal .....	70	55	27.3	22	7	28.6
North Korea.....	2	1	0.0	4	4	25.0
Pakistan .....	359	143	22.4	198	68	36.8
Philippines .....	282	199	31.2	197	84	53.6
Singapore.....	2,022	678	33.3	416	106	28.3
South Korea .....	7,772	2,016	57.2	625	193	67.4
Sri Lanka .....	123	69	23.2	65	23	26.1
Taiwan .....	6,276	1,168	60.0	1,019	212	66.5
Thailand .....	718	435	31.5	312	148	33.8
Vietnam .....	176	141	12.1	56	19	5.3
<b>Pacific Region</b>						
Australia .....	15,287	4,840	36.7	11,028	1,683	40.0
Fiji .....	24	18	5.6	35	14	28.6
Kiribati .....	0	0	na	0	0	na
Marshall Islands .....	2	1	0.0	0	0	na
Micronesia .....	2	1	100.0	0	0	na
Nauru .....	0	0	na	0	0	na
New Zealand .....	2,981	1,064	36.7	2,211	405	37.8
Papua New Guinea .....	60	40	22.5	87	31	25.8
Solomon Islands .....	10	7	14.3	5	3	0.0
Tonga .....	2	2	0.0	3	2	100.0
Tuvalu .....	0	0	na	0	0	na
Vanuatu .....	6	4	25.0	7	6	0.0
Western Samoa .....	4	2	50.0	2	1	0.0

na = not applicable

NOTES: Article counts are on a whole-count basis where each country author, including the U.S., receives a whole count on internationally coauthored papers. Internationally authored papers consist of papers that have at least one international coauthor.

SOURCES: Institute for Scientific Information, Science Citation and Social Citation Indexes; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

**Appendix table 5-49.**  
**Intraregional scientific collaboration in selected regions: 1986 and 1999**  
(Percentages)

Western Europe												
Country/ economy	Belgium	Denmark	Finland	France	Germany	Italy	Netherlands	Norway	Spain	Sweden	Switzerland	United Kingdom
<b>Belgium</b>												
1999 .....	na	2.9	2.4	23.8	15.3	9.7	14.0	2.1	5.5	4.6	5.1	15.5
1986 .....	na	1.6	1.2	23.1	11.6	6.9	12.4	0.7	3.0	3.5	6.2	12.0
Change ...	na	1.3	1.1	0.7	3.7	2.8	1.5	1.4	2.4	1.1	-1.1	3.5
<b>Denmark</b>												
1999 .....	3.8	na	5.0	9.6	16.9	8.6	8.2	6.2	5.5	14.6	4.6	19.3
1986 .....	2.0	na	3.5	8.4	13.5	4.0	5.5	5.1	1.4	18.0	4.8	15.4
Change ...	1.8	na	1.5	1.2	3.5	4.6	2.8	1.1	4.1	-3.3	-0.2	3.9
<b>Finland</b>												
1999 .....	4.0	6.4	na	9.5	15.4	7.7	5.9	6.7	3.8	18.3	6.1	15.0
1986 .....	2.7	6.1	na	6.1	13.9	3.9	4.4	4.1	0.5	17.1	5.4	10.4
Change ...	1.3	0.3	na	3.4	1.4	3.8	1.5	2.6	3.3	1.2	0.7	4.7
<b>France</b>												
1999 .....	6.4	1.9	1.5	na	15.1	10.6	4.7	1.4	6.9	3.0	7.2	13.6
1986 .....	6.1	1.7	0.7	na	11.4	8.3	3.7	0.5	4.0	2.8	6.8	10.9
Change ...	0.2	0.2	0.8	na	3.7	2.3	1.0	0.8	2.8	0.2	0.4	2.8
<b>Germany</b>												
1999 .....	3.1	2.6	1.9	11.5	na	7.5	5.8	1.2	4.0	3.7	8.1	12
1986 .....	2.6	2.4	1.4	9.7	na	5.5	5.4	1.1	2.0	3.5	9.4	10.6
Change ..	0.5	0.2	0.4	1.8	na	1.9	0.4	0.1	2.0	0.2	-1.4	1.5
<b>Italy</b>												
1999 .....	4.2	2.8	2.0	17.2	16.0	na	6.0	1.3	7.8	3.9	8.5	16.3
1986 .....	3.5	1.6	0.9	15.6	12.3	na	4.2	0.5	3.2	3.6	8.7	14.5
Change ...	4.2	2.8	2.0	17.2	16.0	na	6.0	1.3	7.8	3.9	8.5	16.3
<b>Netherlands</b>												
1999 .....	9.2	4.1	2.3	11.5	18.7	9.1	na	2.0	5.0	4.8	5.6	19.1
1986 .....	8.9	3.1	1.4	9.9	17.0	6.0	na	1.4	1.9	4.0	5.6	15.7
Change ...	0.3	1.0	0.9	1.6	1.6	3.0	na	0.6	3.1	0.8	-0.1	3.4
<b>Norway</b>												
1999 .....	4.8	11.0	9.3	11.9	14.0	7.0	7.0	na	4.3	20.7	5.5	16.0
1986 .....	1.6	9.2	4.2	4.6	10.9	2.5	4.6	na	0.5	23.4	3.5	15.7
Change ...	3.3	1.8	5.1	7.3	3.1	4.6	2.5	na	3.8	-2.7	2.0	0.3
<b>Spain</b>												
1999 .....	3.7	2.8	1.5	17.1	13.3	12.0	5.1	1.2	na	3.2	4.3	16.8
1986 .....	4.4	1.5	0.3	21.8	13.0	9.1	3.7	0.3	na	2.7	3.8	18.7
Change ...	-0.7	1.2	1.2	-4.7	0.4	2.8	1.3	0.9	na	0.4	0.4	-1.9
<b>Sweden</b>												
1999 .....	3.5	8.4	8.3	8.7	13.8	6.8	5.5	6.7	3.6	na	3.7	14.7
1986 .....	2.4	9.5	5.2	7.2	10.4	4.9	3.8	6.9	1.3	na	5.3	11.4
Change ...	1.1	-1.1	3.1	1.4	3.3	1.9	1.8	-0.1	2.3	na	-1.6	3.4
<b>Switzerland</b>												
1999 .....	3.5	2.4	2.5	18.5	27.5	13.5	5.8	1.6	4.4	3.4	na	14.8
1986 .....	3.8	2.3	1.5	15.4	25.2	10.4	4.7	0.9	1.6	4.7	na	11.8
Change ...	-0.2	0.1	1.1	3.1	2.3	3.0	1.1	0.7	2.8	-1.3	na	3.0
<b>United Kingdom</b>												
1999 .....	3.4	3.2	2.0	11.3	13.1	8.3	6.4	1.5	5.6	4.3	4.7	na
1986 .....	2.4	2.4	0.9	8.2	9.4	5.8	4.4	1.4	2.6	3.4	3.9	na
Change ...	1.0	0.8	1.1	3.1	3.8	2.5	2.0	0.2	3.0	0.9	0.8	na

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-49.  
**Intraregional scientific collaboration in selected regions: 1986 and 1999**  
(Percentages)

Asia												
Country/ economy	China	Hong Kong	India	Indonesia	Japan	Malaysia	Philippines	Singapore	South Korea	Taiwanese Economy	Thailand	Vietnam
<b>China</b>												
1999 .....	na	10.8	1.7	0.1	16.4	1.5	0.3	3.0	2.3	2.5	0.4	0.1
1986 .....	na	0.1	0.1	0.4	12.1	0.0	0.1	0.3	0.5	0.8	0.3	0.0
Change ...	na	10.6	1.6	-0.3	4.4	1.5	0.1	2.7	1.8	1.7	0.1	0.1
<b>Hong Kong</b>												
1999 .....	40.6	na	0.9	0.1	3.0	0.6	0.5	2.8	1.0	2.4	0.5	0.0
1986 .....	7.1	na	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change ...	33.4	na	0.9	0.1	-4.1	0.6	0.5	2.8	1.0	2.4	0.5	0.0
<b>India</b>												
1999 .....	3.6	0.5	na	0.4	10.3	3.5	0.7	0.7	1.7	1.8	0.4	0.2
1986 .....	0.1	0.0	na	0.1	7.5	0.2	0.2	0.4	0.1	0.0	0.3	0.0
Change ...	3.5	0.5	na	0.3	2.7	3.3	0.5	0.2	1.6	1.8	0.1	0.2
<b>Indonesia</b>												
1999 .....	1.3	0.4	3.4	na	25.9	0.9	2.2	1.3	0.9	0.4	4.3	2.6
1986 .....	4.9	0.0	1.6	na	23	3.3	1.6	0.0	3.3	0.0	1.6	0.0
Change ...	-3.6	0.4	1.8	na	2.9	-2.4	0.5	1.3	-2.4	0.4	2.7	2.6
<b>Japan</b>												
1999 .....	7.0	0.3	2.1	0.6	na	0.4	0.4	0.3	4.5	1.4	1.0	0.2
1986 .....	3.7	0.0	2.7	0.6	na	0.2	0.7	0.3	1.8	1.5	1.0	0.0
Change ...	3.3	0.3	-0.6	0.1	na	0.1	-0.3	0.0	2.7	-0.1	0.0	0.2
<b>Malaysia</b>												
1999 .....	17.7	1.7	19.5	0.6	9.9	na	0.0	4.4	1.5	0.9	4.4	1.2
1986 .....	0.0	0.0	2.6	2.6	7.7	na	1.3	1.3	2.6	0.0	3.8	0.0
Change ...	17.7	1.7	16.9	-2.0	2.2	na	-1.3	3.1	-1.1	0.9	0.5	1.2
<b>Philippines</b>												
1999 .....	5.0	2.5	7.0	2.5	20.1	0.0	na	0.5	1.0	1.5	9.0	1.5
1986 .....	1.2	0.0	2.4	1.2	21.4	1.2	na	1.2	0.0	2.4	6.0	0.0
Change ...	3.8	2.5	4.7	1.3	-1.3	-1.2	na	-0.7	1.0	-0.9	3.1	1.5
<b>Singapore</b>												
1999 .....	17.6	4.3	1.9	0.4	4.4	2.2	0.1	na	1.8	4.0	1.2	0.4
1986 .....	1.9	0.0	3.8	0	6.6	0.9	0.9	na	0.0	2.8	1.9	0.0
Change ...	15.7	4.3	-1.9	0.4	-2.2	1.3	-0.8	na	1.8	1.2	-0.7	0.4
<b>South Korea</b>												
1999 .....	4.5	0.5	1.6	0.1	20.7	0.2	0.1	0.6	na	1.3	0.3	0.1
1986 .....	2.1	0.0	0.5	1	23.8	1.0	0.0	0.0	na	0.5	0.5	0.0
Change ...	2.4	0.5	1.1	-0.9	-3.1	-0.8	0.1	0.6	na	0.8	-0.2	0.1
<b>Taiwan</b>												
1999 .....	8.4	2.1	3.0	0.1	11.2	0.3	0.3	2.3	2.3	na	0.3	0.1
1986 .....	2.8	0.0	0.0	0	17.5	0.0	0.9	1.4	0.5	na	0.0	0.0
Change ...	5.6	2.1	3.0	0.1	-6.2	0.3	-0.7	0.9	1.8	na	0.3	0.1
<b>Thailand</b>												
1999 .....	3.2	1.1	1.8	2.3	21.6	3.4	4.1	1.8	1.6	0.7	na	3.0
1986 .....	1.4	0.0	2.0	0.7	16.9	2.0	3.4	1.4	0.7	0.0	na	0.0
Change ...	1.9	1.1	-0.2	1.6	4.7	1.4	0.8	0.5	0.9	0.7	na	3.0
<b>Vietnam</b>												
1999 .....	2.8	0.0	2.1	4.3	11.3	2.8	2.1	2.1	2.1	0.7	9.2	na
1986 .....	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	na
Change ...	2.8	0.0	2.1	4.3	11.3	2.8	2.1	2.1	2.1	0.7	9.2	na

See explanatory notes, if any, and SOURCE at end of table.

**Appendix table 5-49.**  
**Intraregional scientific collaboration in selected regions: 1986 and 1999**  
(Percentages)

<b>Latin America</b>											
Country/ economy	Argentina	Brazil	Chile	Colombia	Costa Rica	Cuba	Mexico	Panama	Peru	Uruguay	Venezuela
<b>Argentina</b>											
1999 .....	na	13.1	3.9	2.6	0.1	0.6	4.9	0.1	0.4	3.0	1.5
1986 .....	na	15.8	2.6	0.0	0.0	0.0	1.3	0.0	0.4	0.4	2.1
Change .....	na	-2.7	1.4	2.6	0.1	0.6	3.6	0.1	0.0	2.6	-0.6
<b>Brazil</b>											
1999 .....	5.9	na	2.2	1.6	0.3	1.2	2.5	0.1	0.4	0.8	0.9
1986 .....	6.2	na	2.5	0.7	0.3	0.0	1.3	0.2	0.2	0.0	0.2
Change .....	-0.4	na	-0.3	1.0	0.0	1.2	1.2	-0.1	0.2	0.8	0.7
<b>Chile</b>											
1999 .....	6.7	8.5	na	0.8	0.0	0.8	5.5	0.2	0.2	1.7	1.5
1986 .....	2.8	7.0	na	0.9	0.0	0.0	2.8	0.0	0.0	0.0	0.9
Change .....	3.9	1.5	na	-0.2	0.0	0.8	2.7	0.2	0.2	1.7	0.6
<b>Colombia</b>											
1999 .....	11.3	16.0	2.0	na	0.8	2.3	13.7	0.8	2.0	0.8	1.6
1986 .....	0.0	6.3	3.1	na	1.6	0.0	3.1	0.0	1.6	0.0	1.6
Change .....	11.3	9.8	-1.2	na	-0.8	2.3	10.5	0.8	0.4	0.8	0.0
<b>Costa Rica</b>											
1999 .....	1.0	8.0	0.0	2.0	na	0.0	4.0	1.0	1.0	0.0	0.0
1986 .....	0.0	6.3	0.0	3.1	na	0.0	3.1	0.0	0.0	0.0	0.0
Change .....	1.0	1.8	0.0	-1.1	na	0.0	0.9	1.0	1.0	0.0	0.0
<b>Cuba</b>											
1999 .....	3.4	14.2	2.5	2.9	0.0	na	20.1	0.0	0.5	0.5	3.4
1986 .....	0.0	0.0	0.0	0.0	0.0	na	0.0	0.0	0.0	0.0	0.0
Change .....	3.4	14.2	2.5	2.9	0.0	na	20.1	0.0	0.5	0.5	3.4
<b>Mexico</b>											
1999 .....	3.9	4.4	2.5	2.5	0.3	2.9	na	0.0	0.3	0.5	0.8
1986 .....	1.0	2.6	1.9	0.6	0.3	0.0	na	0.0	0.0	0.3	0.6
Change .....	2.9	1.9	0.6	1.8	0.0	2.9	na	0.0	0.3	0.2	0.1
<b>Panama</b>											
1999 .....	1.6	3.1	1.6	3.1	1.6	0.0	0.0	na	0.0	0.0	1.6
1986 .....	0.0	3.6	0.0	0.0	0.0	0.0	0.0	na	0.0	0.0	0.0
Change .....	1.6	-0.4	1.6	3.1	1.6	0.0	0.0	na	0.0	0.0	1.6
<b>Peru</b>											
1999 .....	4.8	9.5	1.0	4.8	1.0	1.0	3.8	0.0	na	1.0	1.0
1986 .....	2.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0	na	0.0	2.0
Change .....	2.7	7.5	1.0	2.7	1.0	1.0	3.8	0.0	na	1.0	-1.1
<b>Uruguay</b>											
1999 .....	19.8	11.6	6.4	1.2	0.0	0.6	4.1	0.0	0.6	na	1.2
1986 .....	9.1	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	na	0.0
Change .....	10.7	11.6	6.4	1.2	0.0	0.6	-5.0	0.0	0.6	na	1.2
<b>Venezuela</b>											
1999 .....	5.1	6.6	3.0	1.2	0.0	2.1	3.3	0.3	0.3	0.6	na
1986 .....	4.2	0.8	1.7	0.8	0.0	0.0	1.7	0.0	0.8	0.0	na
Change .....	1.0	5.8	1.4	0.4	0.0	2.1	1.7	0.3	-0.5	0.6	na

na = not applicable

NOTES: Data are share of indicated countries' internationally coauthored papers with other countries in the same region. Internationally coauthored papers are on a whole-count basis, where each coauthor's country is credited with a whole count. Share percentages may exceed 100% in instances of papers with more than two country authors within the region.

SOURCES: Institute for Scientific Information, Science Citation and Social Citation Indexes; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

Appendix table 5-50.

**Citations by world's scientific papers to scientific literature, by region and country/economy: 1990, 1994, and 1999**  
 (All fields)

Cited region/country/economy	1990		1994		1999	
	Number	World share (%)	Number	World share (%)	Number	World share (%)
<b>Worldwide</b>						
<b>Total</b>	2,098,342	100.0	2,518,783	100.00	2,749,022	100.00
<b>North America</b>						
<b>Total</b>	1,181,861	56.32	1,368,391	54.33	1,360,447	49.49
Canada	88,705	4.23	106,594	4.23	111,028	4.04
United States	1,093,156	52.10	1,261,797	50.10	1,249,419	45.45
<b>Latin America</b>						
<b>Total</b>	12,214	0.58	16,508	0.66	26,874	0.98
Antigua and Barbuda	1	0.00	0	0.00	0	0.00
Argentina	3,136	0.15	3,623	0.14	5,691	0.21
Bahamas	8	0.00	5	0.00	2	0.00
Barbados	32	0.00	35	0.00	38	0.00
Belize	0	0.00	1	0.00	6	0.00
Bolivia	19	0.00	38	0.00	88	0.00
Brazil	3,437	0.16	5,906	0.23	10,197	0.37
Chile	1,472	0.07	1,766	0.07	2,384	0.09
Colombia	229	0.01	308	0.01	512	0.02
Costa Rica	117	0.01	173	0.01	245	0.01
Cuba	110	0.01	133	0.01	389	0.01
Dominican Republic	13	0.00	15	0.00	14	0.00
Ecuador	18	0.00	53	0.00	108	0.00
El Salvador	3	0.00	4	0.00	5	0.00
Grenada	0	0.00	0	0.00	1	0.00
Guatemala	45	0.00	73	0.00	63	0.00
Guyana	6	0.00	7	0.00	6	0.00
Haiti	14	0.00	22	0.00	5	0.00
Honduras	4	0.00	7	0.00	13	0.00
Jamaica	114	0.01	107	0.00	153	0.01
Mexico	2,243	0.11	2,824	0.11	5,103	0.19
Nicaragua	4	0.00	9	0.00	16	0.00
Panama	124	0.01	183	0.01	217	0.01
Paraguay	11	0.00	14	0.00	13	0.00
Peru	166	0.01	180	0.01	139	0.01
St. Kitts	0	0.00	0	0.00	1	0.00
St. Lucia	0	0.00	11	0.00	5	0.00
St. Vincents	0	0.00	0	0.00	8	0.00
Suriname	0	0.00	1	0.00	2	0.00
Trinidad and Tobago	56	0.00	47	0.00	57	0.00
Uruguay	82	0.00	176	0.01	383	0.01
Venezuela	750	0.04	787	0.03	1,010	0.04
<b>Sub-Saharan Africa</b>						
<b>Total</b>	8,303	0.40	8,771	0.35	8,466	0.31
Angola	0	0.00	3	0.00	1	0.00
Benin	3	0.00	19	0.00	29	0.00
Botswana	24	0.00	30	0.00	32	0.00
Burkina Faso	35	0.00	53	0.00	29	0.00
Burundi	13	0.00	5	0.00	19	0.00
Cameroon	38	0.00	106	0.00	105	0.00
Cape Verde	2	0.00	0	0.00	3	0.00
Central Africa Republic	30	0.00	12	0.00	9	0.00
Chad Republic	0	0.00	2	0.00	4	0.00
Comoros	0	0.00	0	0.00	0	0.00
Congo, Democratic Republic	110	0.01	69	0.00	31	0.00
Congo, Republic	38	0.00	44	0.00	15	0.00
Côte d'Ivoire	65	0.00	113	0.00	102	0.00

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-50.

**Citations by world's scientific papers to scientific literature, by region and country/economy: 1990,****1994, and 1999**

(All fields)

Cited region/country/economy	1990		1994		1999	
	Number	World share (%)	Number	World share (%)	Number	World share (%)
<b>Sub-Saharan Africa</b>						
Djibouti .....	1	0.00	6	0.00	1	0.00
Equatorial Guinea .....	0	0.00	0	0.00	1	0.00
Eritrea .....	0	0.00	0	0.00	1	0.00
Ethiopia .....	104	0.00	140	0.01	149	0.01
Gabon Republic .....	40	0.00	46	0.00	59	0.00
Gambia .....	0	0.00	0	0.00	179	0.01
Ghana .....	30	0.00	66	0.00	97	0.00
Guinea Republic .....	4	0.00	3	0.00	8	0.00
Guinea-Bissau .....	2	0.00	7	0.00	17	0.00
Kenya .....	797	0.04	634	0.03	695	0.03
Lesotho .....	4	0.00	5	0.00	1	0.00
Liberia .....	17	0.00	23	0.00	6	0.00
Madagascar .....	10	0.00	25	0.00	37	0.00
Malawi .....	45	0.00	44	0.00	89	0.00
Mali .....	12	0.00	19	0.00	47	0.00
Mauritania .....	1	0.00	1	0.00	2	0.00
Mauritius .....	1	0.00	10	0.00	8	0.00
Mozambique .....	13	0.00	9	0.00	16	0.00
Namibia .....	0	0.00	25	0.00	29	0.00
Niger .....	13	0.00	43	0.00	49	0.00
Nigeria .....	714	0.03	598	0.02	406	0.01
Rwanda .....	31	0.00	38	0.00	22	0.00
Sao Tome and Principe .....	0	0.00	0	0.00	0	0.00
Senegal .....	0	0.00	0	0.00	236	0.01
Seychelles .....	0	0.00	3	0.00	18	0.00
Sierra Leone .....	23	0.00	17	0.00	13	0.00
Somalia .....	10	0.00	12	0.00	3	0.00
South Africa .....	5,656	0.27	5,930	0.24	5,170	0.19
Sudan .....	84	0.00	120	0.00	86	0.00
Swaziland .....	2	0.00	7	0.00	7	0.00
Tanzania .....	88	0.00	155	0.01	256	0.01
Togo .....	6	0.00	13	0.00	11	0.00
Uganda .....	30	0.00	35	0.00	110	0.00
Zambia .....	39	0.00	57	0.00	62	0.00
Zimbabwe .....	168	0.01	224	0.01	196	0.01
<b>Near East and North Africa</b>						
<b>Total</b> .....	21,605	1.03	23,993	0.95	28,854	1.05
Algeria .....	112	0.01	156	0.01	184	0.01
Bahrain .....	29	0.00	36	0.00	32	0.00
Egypt .....	1,225	0.06	1,444	0.06	1,700	0.06
Iran .....	112	0.01	204	0.01	657	0.02
Iraq .....	209	0.01	98	0.00	20	0.00
Israel .....	17,930	0.85	19,859	0.79	23,444	0.85
Jordan .....	187	0.01	175	0.01	181	0.01
Kuwait .....	438	0.02	309	0.01	333	0.01
Lebanon .....	60	0.00	50	0.00	108	0.00
Libya .....	48	0.00	25	0.00	23	0.00
Morocco .....	104	0.00	204	0.01	472	0.02
North Yemen .....	3	0.00	19	0.00	0	0.00
Oman .....	6	0.00	42	0.00	67	0.00
Qatar .....	27	0.00	42	0.00	21	0.00
Saudi Arabia .....	955	0.05	973	0.04	1,014	0.04
South Yemen .....	1	0.00	3	0.00	0	0.00
Syria .....	35	0.00	88	0.00	86	0.00
Tunisia .....	108	0.01	183	0.01	287	0.01
United Arab Emirates .....	16	0.00	83	0.00	214	0.01

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-50.

**Citations by world's scientific papers to scientific literature, by region and country/economy: 1990, 1994, and 1999**  
 (All fields)

Cited region/country/economy	1990		1994		1999	
	Number	World share (%)	Number	World share (%)	Number	World share (%)
<b>Western Europe</b>						
<b>Total</b>	629,039	29.98	790,820	31.40	939,901	34.19
Albania	0	0.00	10	0.00	20	0.00
Andorra	0	0.00	0	0.00	1	0.00
Austria	7,736	0.37	11,074	0.44	15,818	0.58
Belgium	16,170	0.77	20,078	0.80	23,840	0.87
Bosnia	0	0.00	0	0.00	18	0.00
Croatia	0	0.00	0	0.00	1,131	0.04
Cyprus	16	0.00	17	0.00	93	0.00
Denmark	16,538	0.79	20,027	0.80	21,962	0.80
Finland	11,383	0.54	14,883	0.59	20,584	0.75
France	88,890	4.24	112,437	4.46	131,443	4.78
Germany (East)	6,182	0.29	3,568	0.14	0	0.00
Germany	115,261	5.49	151,407	6.01	191,198	6.96
Greece	2,432	0.12	3,650	0.14	5,730	0.21
Iceland	265	0.01	334	0.01	584	0.02
Ireland	2,399	0.11	3,589	0.14	4,773	0.17
Italy	38,844	1.85	57,241	2.27	76,520	2.78
Liechtenstein	15	0.00	17	0.00	30	0.00
Luxemborg	15	0.00	21	0.00	80	0.00
Macedonia	0	0.00	0	0.00	82	0.00
Malta	2	0.00	10	0.00	34	0.00
Monaco	45	0.00	75	0.00	89	0.00
Netherlands	42,953	2.05	56,780	2.25	65,292	2.38
Norway	8,229	0.39	9,624	0.38	11,114	0.40
Portugal	962	0.05	1,768	0.07	3,313	0.12
San Marino	0	0.00	1	0.00	1	0.00
Slovenia	0	0.00	0	0.00	1,352	0.05
Spain	14,443	0.69	26,313	1.04	44,577	1.62
Sweden	39,019	1.86	44,082	1.75	46,742	1.70
Switzerland	35,619	1.70	42,136	1.67	49,236	1.79
Turkey	755	0.04	1,333	0.05	3,512	0.13
United Kingdom	178,765	8.52	207,565	8.24	219,866	8.00
Vatican	6	0.00	4	0.00	5	0.00
Yugoslavia	2,095	0.10	2,776	0.11	861	0.03
<b>Eastern Europe</b>						
<b>Total</b>	42,145	2.01	49,609	1.97	56,488	2.05
Armenia	0	0.00	0	0.00	179	0.01
Azerbaijan	0	0.00	0	0.00	59	0.00
Bulgaria	1,174	0.06	1,637	0.06	1,669	0.06
Byelarus	0	0.00	0	0.00	715	0.03
Czech Republic	0	0.00	0	0.00	4,754	0.17
Czechoslovakia	4,299	0.20	5,496	0.22	2	0.00
Estonia	0	0.00	0	0.00	649	0.02
Georgia	0	0.00	0	0.00	149	0.01
Hungary	4,171	0.20	4,575	0.18	5,372	0.20
Kazakhstan	0	0.00	0	0.00	76	0.00
Kyrgyzstan	0	0.00	0	0.00	12	0.00
Latvia	0	0.00	0	0.00	340	0.01
Lithuania	0	0.00	0	0.00	490	0.02
Moldova	0	0.00	0	0.00	122	0.00
Poland	7,331	0.35	8,329	0.33	10,380	0.38
Romania	486	0.02	594	0.02	1,128	0.04
Russia	0	0.00	0	0.00	25,431	0.93
Slovakia	0	0.00	0	0.00	1,892	0.07
Tajikistan	0	0.00	0	0.00	15	0.00
Turkmenistan	0	0.00	0	0.00	3	0.00
USSR	24,684	1.18	28,978	1.15	0	0.00

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-50.

**Citations by world's scientific papers to scientific literature, by region and country/economy: 1990, 1994, and 1999**  
 (All fields)

Cited region/country/economy	1990		1994		1999	
	Number	World share (%)	Number	World share (%)	Number	World share (%)
Ukraine .....	0	0.00	0	0.00	2,877	0.10
Uzbekistan .....	0	0.00	0	0.00	174	0.01
<b>Asia</b>						
<b>Total</b> .....	153,294	7.31	208,603	8.28	263,941	9.60
Afghanistan .....	1	0.00	1	0.00	0	0.00
Bangladesh .....	221	0.01	203	0.01	286	0.01
Bhutan .....	0	0.00	1	0.00	0	0.00
Brunei .....	6	0.00	5	0.00	20	0.00
Cambodia .....	0	0.00	0	0.00	2	0.00
China .....	4,666	0.22	8,660	0.34	15,846	0.58
Hong Kong .....	1,309	0.06	2,445	0.10	5,793	0.21
India .....	12,046	0.57	15,179	0.60	16,928	0.62
Indonesia .....	119	0.01	168	0.01	338	0.01
Japan .....	128,642	6.13	167,901	6.67	194,341	7.07
Laos .....	0	0.00	1	0.00	3	0.00
Malaysia .....	277	0.01	400	0.02	631	0.02
Mongolia .....	5	0.00	15	0.00	50	0.00
Myanmar .....	34	0.00	28	0.00	16	0.00
North Korea .....	7	0.00	1	0.00	0	0.00
Nepal .....	18	0.00	61	0.00	65	0.00
Pakistan .....	257	0.01	344	0.01	389	0.01
Philippines .....	350	0.02	315	0.01	508	0.02
South Korea .....	1,335	0.06	3,462	0.14	11,271	0.41
Singapore .....	689	0.03	1,700	0.07	3,052	0.11
Sri Lanka .....	179	0.01	151	0.01	126	0.00
Taiwan .....	2,626	0.13	6,773	0.27	13,267	0.48
Thailand .....	507	0.02	789	0.03	1,009	0.04
<b>Pacific</b>						
<b>Total</b> .....	49,881	2.38	52,088	2.07	64,051	2.33
Australia .....	42,416	2.02	44,066	1.75	54,589	1.99
Fiji .....	43	0.00	16	0.00	12	0.00
Kiribati .....	0	0.00	0	0.00	0	0.00
Maldives .....	0	0.00	0	0.00	3	0.00
Marsh Islands .....	0	0.00	1	0.00	8	0.00
Micronesia .....	0	0.00	0	0.00	5	0.00
New Zealand .....	7,220	0.34	7,796	0.31	9,141	0.33
Nauru .....	1	0.00	0	0.00	0	0.00
Papau New Guinea .....	148	0.01	97	0.00	101	0.00
Solom Islands .....	5	0.00	13	0.00	4	0.00
Tonga .....	0	0.00	4	0.00	1	0.00
Tuvalu .....	0	0.00	0	0.00	0	0.00
Vanuatu .....	3	0.00	4	0.00	5	0.00
Vietnam .....	43	0.00	88	0.00	181	0.01
Western Samoa .....	2	0.00	3	0.00	1	0.00

NOTES: Citations are on the basis of a three-year window with a two-year lag; for example, 1999 citations counts are articles published in 1999 citing articles published in 1995-97. Nationality of the cited paper is determined by the institutional address of the cited paper.

Germany has citation data to unified Germany starting in 1992, and citation data to former West Germany prior to 1992. Former USSR consist of present East European and Central Asian countries that were former members.

SOURCES: Institute for Scientific Information, Science Citation and Social Citation Indexes; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

Appendix table 5-51.

**Relative prominence of scientific and technical literature, by region: 1990–99**  
 (Relative Citation Indexes<sup>1</sup>)

Year	United States	Latin America	Sub-Saharan Africa	Near East and North Africa	Western Europe	Eastern Europe	East Asia NIEs	Asia and Pacific
<b>United States</b>								
1990 .....	1.84	0.29	0.24	0.46	0.60	0.07	0.26	0.44
1991 .....	1.85	0.29	0.23	0.45	0.60	0.07	0.27	0.44
1992 .....	1.85	0.28	0.24	0.44	0.61	0.08	0.28	0.44
1993 .....	1.84	0.28	0.23	0.45	0.62	0.09	0.29	0.43
1994 .....	1.85	0.28	0.24	0.46	0.63	0.10	0.30	0.43
1995 .....	1.86	0.28	0.23	0.46	0.63	0.11	0.29	0.42
1996 .....	1.88	0.31	0.24	0.47	0.63	0.12	0.28	0.42
1997 .....	1.88	0.31	0.23	0.46	0.63	0.12	0.28	0.42
1998 .....	1.92	0.30	0.24	0.46	0.63	0.13	0.28	0.42
1999 .....	1.94	0.31	0.24	0.47	0.64	0.13	0.29	0.43
<b>Latin America</b>								
1990 .....	1.04	16.95	0.74	0.66	0.81	0.16	0.41	0.57
1991 .....	1.03	16.32	0.69	0.64	0.86	0.14	0.48	0.56
1992 .....	1.02	15.72	0.69	0.65	0.85	0.17	0.45	0.57
1993 .....	1.01	15.37	0.71	0.63	0.85	0.19	0.43	0.55
1994 .....	1.03	13.95	0.73	0.67	0.86	0.22	0.47	0.54
1995 .....	1.01	13.31	0.70	0.68	0.88	0.23	0.43	0.55
1996 .....	1.04	12.83	0.77	0.57	0.87	0.26	0.49	0.52
1997 .....	0.98	12.86	0.70	0.62	0.88	0.27	0.51	0.57
1998 .....	1.02	11.87	0.73	0.66	0.86	0.30	0.45	0.54
1999 .....	0.97	11.39	0.72	0.65	0.87	0.32	0.50	0.57
<b>Sub-Saharan Africa</b>								
1990 .....	0.82	0.85	28.51	0.75	0.82	0.07	0.60	0.65
1991 .....	0.82	0.99	28.92	0.62	0.83	0.11	0.73	0.64
1992 .....	0.86	0.81	28.21	0.72	0.86	0.09	0.63	0.61
1993 .....	0.83	0.75	29.96	0.93	0.85	0.16	0.48	0.58
1994 .....	0.83	0.97	28.52	0.85	0.88	0.19	0.65	0.62
1995 .....	0.82	0.94	31.30	0.82	0.88	0.14	0.53	0.58
1996 .....	0.88	1.01	30.28	0.75	0.86	0.17	0.48	0.58
1997 .....	0.83	0.93	29.77	0.86	0.92	0.22	0.55	0.60
1998 .....	0.89	0.97	29.90	0.79	0.90	0.21	0.42	0.60
1999 .....	0.85	0.93	31.98	0.67	0.91	0.20	0.54	0.62
<b>Near East and North Africa</b>								
1990 .....	1.15	0.43	0.51	12.81	0.74	0.11	0.45	0.51
1991 .....	1.14	0.47	0.50	12.62	0.75	0.14	0.45	0.50
1992 .....	1.16	0.36	0.60	11.89	0.75	0.15	0.40	0.55
1993 .....	1.16	0.39	0.50	12.02	0.77	0.18	0.43	0.50
1994 .....	1.14	0.42	0.62	11.84	0.80	0.22	0.43	0.50
1995 .....	1.13	0.48	0.47	11.93	0.81	0.22	0.44	0.50
1996 .....	1.13	0.49	0.47	11.47	0.82	0.24	0.49	0.52
1997 .....	1.12	0.48	0.62	11.33	0.81	0.25	0.46	0.52
1998 .....	1.09	0.52	0.63	11.36	0.83	0.28	0.54	0.54
1999 .....	1.08	0.57	0.51	11.26	0.83	0.30	0.52	0.56
<b>Western Europe</b>								
1990 .....	0.98	0.34	0.32	0.49	1.61	0.13	0.32	0.52
1991 .....	1.00	0.33	0.32	0.47	1.60	0.13	0.33	0.51
1992 .....	1.00	0.35	0.34	0.47	1.59	0.14	0.32	0.52
1993 .....	1.00	0.34	0.34	0.48	1.57	0.15	0.33	0.51
1994 .....	1.01	0.35	0.35	0.49	1.55	0.17	0.35	0.51
1995 .....	1.01	0.36	0.35	0.51	1.52	0.19	0.35	0.51

<sup>1</sup>Relative prominence of scientific literature is measured on the basis of the relative citation index of the region. This index is the share of the country/region's share of cited literature adjusted for its share of published literature. An index of 1.00 would indicate that the region's share of cited literature is equal to the region's world share of scientific literature. An index greater (less) than 1.00 would indicate that the region is cited relatively more (less) frequently than is indicated by the region's share of scientific literature.

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-51.

**Relative prominence of scientific and technical literature, by region: 1990–99**  
 (Percentages)

Year	United States	Latin America	Sub-Saharan Africa	Near East and North Africa	Western Europe	Eastern Europe	East Asia NIEs	Asia and Pacific
1996 .....	1.01	0.38	0.35	0.50	1.51	0.20	0.34	0.50
1997 .....	1.00	0.39	0.38	0.50	1.49	0.22	0.35	0.50
1998 .....	1.01	0.38	0.39	0.50	1.47	0.24	0.34	0.50
1999 .....	1.02	0.39	0.39	0.50	1.46	0.25	0.33	0.50
<b>Eastern Europe</b>								
1990 .....	0.78	0.40	0.22	0.52	0.83	3.54	0.43	0.63
1991 .....	0.80	0.44	0.23	0.59	0.85	3.36	0.36	0.65
1992 .....	0.78	0.42	0.21	0.51	0.85	3.51	0.37	0.63
1993 .....	0.79	0.42	0.22	0.53	0.87	3.51	0.44	0.62
1994 .....	0.78	0.47	0.23	0.52	0.90	3.55	0.41	0.60
1995 .....	0.79	0.43	0.21	0.51	0.90	3.81	0.40	0.60
1996 .....	0.79	0.53	0.27	0.59	0.92	3.88	0.39	0.56
1997 .....	0.77	0.50	0.26	0.60	0.93	4.07	0.40	0.58
1998 .....	0.79	0.55	0.28	0.59	0.93	4.11	0.43	0.58
1999 .....	0.78	0.51	0.25	0.63	0.93	4.27	0.45	0.57
<b>East Asia NIEs</b>								
1990 .....	1.07	0.39	0.36	0.62	0.76	0.11	27.73	1.02
1991 .....	1.15	0.53	0.43	0.61	0.69	0.10	22.59	0.97
1992 .....	1.14	0.50	0.42	0.56	0.71	0.11	19.56	0.96
1993 .....	1.12	0.44	0.36	0.57	0.71	0.14	18.75	0.88
1994 .....	1.11	0.38	0.34	0.57	0.72	0.15	15.58	0.94
1995 .....	1.13	0.45	0.32	0.59	0.71	0.17	13.04	0.93
1996 .....	1.12	0.39	0.32	0.54	0.71	0.18	11.68	0.90
1997 .....	1.07	0.39	0.32	0.60	0.73	0.19	10.35	0.93
1998 .....	1.08	0.42	0.35	0.62	0.69	0.20	9.63	0.92
1999 .....	1.10	0.41	0.33	0.63	0.69	0.23	8.36	0.91
<b>Asia and Pacific</b>								
1990 .....	0.95	0.33	0.31	0.42	0.68	0.10	0.49	2.92
1991 .....	0.96	0.35	0.29	0.43	0.69	0.11	0.51	2.85
1992 .....	0.95	0.31	0.31	0.41	0.69	0.11	0.51	2.83
1993 .....	0.97	0.31	0.31	0.40	0.71	0.13	0.50	2.71
1994 .....	0.96	0.33	0.30	0.43	0.70	0.13	0.54	2.69
1995 .....	0.97	0.32	0.29	0.43	0.71	0.15	0.53	2.59
1996 .....	0.97	0.33	0.30	0.44	0.71	0.17	0.53	2.53
1997 .....	0.99	0.35	0.29	0.44	0.71	0.18	0.55	2.45
1998 .....	0.98	0.35	0.32	0.44	0.70	0.19	0.61	2.42
1999 .....	0.99	0.37	0.31	0.47	0.70	0.21	0.67	2.37
<b>Worldwide</b>								
1990 .....	1.36	0.48	0.41	0.61	0.97	0.22	0.48	0.74
1991 .....	1.38	0.47	0.40	0.59	0.97	0.21	0.48	0.73
1992 .....	1.37	0.46	0.42	0.58	0.97	0.22	0.48	0.74
1993 .....	1.36	0.46	0.42	0.60	0.98	0.22	0.51	0.72
1994 .....	1.36	0.47	0.43	0.60	0.98	0.24	0.53	0.73
1995 .....	1.35	0.47	0.41	0.62	0.98	0.26	0.52	0.72
1996 .....	1.35	0.51	0.41	0.61	0.98	0.27	0.52	0.71
1997 .....	1.34	0.53	0.42	0.61	0.99	0.29	0.52	0.71
1998 .....	1.35	0.53	0.44	0.61	0.98	0.31	0.52	0.72
1999 .....	1.35	0.55	0.44	0.63	0.98	0.33	0.54	0.73

NOTES: East Asia NIEs (newly industrialized economies) are Taiwan, Singapore, South Korea, and Hong Kong. Asia and Pacific exclude East Asian NIEs.

SOURCES: Institute for Scientific Information, Science and Social Citation Indexes; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

Appendix table 5-52.

**Relative prominence of scientific literature by country/economy and field: 1990, 1994, and 1999**  
 (Relative Citation Indexes<sup>1</sup>)

Country/economy	All fields			Country/economy	Biology			Country/economy	Biomedical research		
	1990	1994	1999		1990	1994	1999		1990	1994	1999
1 Switzerland	1.46	1.41	1.37	Switzerland	1.14	1.30	1.41	United States	1.46	1.43	1.40
2 United States	1.36	1.36	1.35	Sweden	1.40	1.27	1.30	Switzerland	1.58	1.37	1.40
3 Netherlands	1.13	1.13	1.12	United Kingdom	1.14	1.15	1.25	Germany	1.04	1.05	1.00
4 Sweden	1.14	1.11	1.07	Denmark	1.03	1.19	1.21	Israel	0.90	0.94	0.99
5 Denmark	1.03	1.06	1.04	Netherlands	1.13	1.27	1.19	United Kingdom	1.07	1.06	0.98
6 United Kingdom	1.06	1.08	1.04	Norway	1.06	1.00	1.18	Canada	0.82	0.86	0.91
7 Finland	0.89	0.94	1.02	Finland	0.86	1.02	1.17	Netherlands	0.96	0.92	0.89
8 Germany	0.99	1.00	1.01	United States	1.20	1.21	1.16	Sweden	1.01	0.88	0.87
9 Canada	0.93	0.95	0.99	Belgium	0.85	0.95	1.14	Finland	0.73	0.75	0.86
10 Belgium	0.98	0.99	0.95	France	0.93	0.94	1.11	Austria	0.75	0.83	0.83
11 France	0.94	0.98	0.93	Germany	1.11	1.04	1.08	France	0.88	0.89	0.82
12 Austria	0.74	0.81	0.91	Hong Kong	na	na	1.08	Belgium	0.83	0.83	0.80
13 Italy	0.81	0.85	0.88	Chile	0.84	0.67	1.06	Australia	0.85	0.72	0.78
14 Australia	0.94	0.84	0.87	Canada	1.08	1.08	1.05	Japan	0.85	0.83	0.78
15 Israel	0.80	0.82	0.84	Austria	0.86	0.74	1.04	Denmark	0.83	0.80	0.77
16 Japan	0.87	0.86	0.83	Australia	1.10	1.06	1.04	Singapore	na	0.72	0.75
17 Ireland	0.69	0.83	0.82	Ireland	0.75	0.94	0.99	Norway	0.63	0.65	0.67
18 Norway	0.81	0.79	0.82	Philippines	0.69	0.51	0.98	Italy	0.60	0.61	0.62
19 Spain	0.62	0.70	0.79	Israel	0.88	0.98	0.92	Ireland	0.58	0.59	0.57
20 New Zealand	0.80	0.74	0.76	Spain	0.71	0.71	0.92	New Zealand	0.69	0.57	0.57
21 Portugal	na	0.57	0.64	New Zealand	0.79	0.88	0.89	Spain	0.42	0.50	0.55
22 Hong Kong	0.63	0.59	0.62	Hungary	0.56	0.70	0.87	Hungary	0.34	0.38	0.51
23 Hungary	0.51	0.54	0.60	Colombia	na	0.75	0.85	South Korea	na	0.37	0.49
24 Slovenia	na	na	0.58	Italy	0.82	0.78	0.85	Chile	0.36	0.37	0.46
25 Argentina	0.47	0.48	0.55	Portugal	na	0.80	0.81	Portugal	na	0.42	0.46
26 Chile	0.49	0.45	0.55	Japan	0.80	0.79	0.79	Greece	0.37	0.39	0.45
27 Brazil	0.42	0.44	0.54	South Korea	na	0.72	0.74	Hong Kong	na	na	0.45
28 Mexico	0.55	0.52	0.54	Taiwan	0.52	0.64	0.70	Taiwan	0.47	0.51	0.44
29 Greece	0.43	0.47	0.53	Kenya	0.69	0.50	0.69	Mexico	0.44	0.37	0.42
30 Singapore	na	0.54	0.53	Brazil	0.62	0.52	0.62	Argentina	0.29	0.33	0.35
31 South Korea	0.45	0.49	0.53	Argentina	0.55	0.64	0.61	Poland	0.29	0.26	0.34
32 Taiwan	0.50	0.52	0.52	South Africa	0.65	0.67	0.61	China	0.19	0.18	0.33
33 South Africa	0.47	0.49	0.48	Czech Republic	na	na	0.61	Brazil	0.28	0.25	0.31
34 Poland	0.41	0.43	0.47	Singapore	na	0.71	0.60	South Africa	0.34	0.32	0.30
35 Czech Republic	na	na	0.45	Turkey	na	0.56	0.58	Czech Republic	na	na	0.29
36 Croatia	na	na	0.40	Thailand	0.39	0.58	0.58	Slovakia	na	na	0.25
37 China	0.30	0.32	0.38	Poland	0.49	0.50	0.57	Bulgaria	0.07	0.08	0.22
38 India	0.28	0.32	0.37	Greece	0.56	0.61	0.56	Turkey	na	na	0.21
39 Turkey	0.36	0.31	0.35	Mexico	0.66	0.64	0.55	India	0.14	0.18	0.21
40 Bulgaria	0.23	0.28	0.35	Slovakia	na	na	0.55	Ukraine	na	na	0.19
41 Slovakia	na	na	0.35	China	0.51	0.51	0.50	Russia	na	na	0.15
42 Saudi Arabia	0.39	0.32	0.29	Malaysia	0.36	0.52	0.50	Egypt	na	na	0.13
43 Romania	0.24	0.25	0.29	Saudi Arabia	0.48	0.45	0.47				
44 Egypt	0.25	0.22	0.27	Venezuela	na	0.54	0.45				
45 Russia	na	na	0.27	India	0.36	0.40	0.42				
46 Belarus	na	na	0.23	Estonia	na	na	0.41				
47 Ukraine	na	na	0.23	Egypt	0.35	0.28	0.40				
48 Pakistan	0.52	0.42	0.40								
49 Ethiopia	na	na	0.39								
50 Bulgaria	na	0.67	0.35								
Country/economy	Chemistry			Country/economy	Clinical medicine			Country/economy	Earth and space		
	1990	1994	1999		1990	1994	1999		1990	1994	1999

1 United States	1.64	1.62	1.50	United States	1.33	1.31	1.27	United States	1.3	1.35	1.31
2 Switzerland	1.47	1.49	1.45	Canada	1.02	1.05	1.11	Chile	1.23	1.23	1.21
3 Netherlands	1.31	1.43	1.41	Netherlands	1.04	1.07	1.08	Switzerland	1.31	1.29	1.16
4 Israel	1.23	1.17	1.33	Switzerland	1.07	1.13	1.08	Netherlands	1.12	1.03	1.14
5 Sweden	1.31	1.53	1.33	Finland	0.85	0.93	1.03	Germany	1.09	0.97	1.11
6 Canada	1.32	1.34	1.30	United Kingdom	1.02	1.04	1.00	United Kingdom	1.08	1.07	1.03
7 Hong Kong	1.26	1.02	1.23	Sweden	0.95	1.00	0.99	France	0.99	1.04	0.93
8 Denmark	1.20	1.25	1.20	Denmark	0.88	0.92	0.94	Canada	1.04	1.02	0.89
9 United Kingdom	1.18	1.15	1.14	Belgium	0.99	0.99	0.92	Italy	0.79	0.94	0.89
10 Germany	1.23	1.16	1.07	Australia	1.00	0.87	0.91	Australia	1.05	0.95	0.88
11 Belgium	0.87	0.97	1.06	Italy	0.75	0.84	0.90	Norway	0.9	0.86	0.86
12 Italy	1.03	1.08	1.05	France	0.80	0.85	0.87	Israel	0.63	0.81	0.85

<sup>1</sup>Relative prominence of scientific literature is measured on the basis of the relative citation index of the country. This index is the country's share of cited literature adjusted for its share of published literature. An index of 1.00 would indicate that the country's share of cited literature is equal to the country's world share of scientific literature. An index greater (less) than 1.00 would indicate that the country is cited relatively more (less) than is indicated by the country's share of scientific literature. Countries with less than a 0.10 percent share of world publications in the cited field and were cited at less than 0.10 percent share of cited literature over the period are excluded or are marked na.

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-52.

**Relative prominence of scientific literature by country/economy and field: 1990, 1994, and 1999**  
 (Relative Citation Indexes<sup>1</sup>)

Country/economy	Chemistry			Clinical medicine			Earth and space				
	1990	1994	1999	Country/economy	1990	1994	1999	Country/economy	1990	1994	1999
13 Spain	0.77	0.88	1.05	Ireland	0.69	0.89	0.87	Denmark	0.85	0.88	0.85
14 Australia	1.24	1.10	1.05	New Zealand	0.93	0.83	0.86	Japan	0.82	0.75	0.83
15 New Zealand	1.23	1.00	1.00	Germany	0.73	0.74	0.83	Spain	0.69	0.7	0.78
16 Japan	1.08	0.99	0.99	Norway	0.83	0.77	0.82	Sweden	1.05	0.94	0.78
17 Ireland	1.20	1.06	0.98	Austria	0.64	0.70	0.81	Belgium	0.69	0.77	0.75
18 Singapore	na	0.96	0.97	Japan	0.77	0.78	0.76	Brazil	0.51	0.51	0.73
19 Austria	0.80	0.91	0.96	Spain	0.63	0.69	0.74	Mexico	0.45	0.63	0.71
20 France	1.01	0.98	0.96	Thailand	na	na	0.67	New Zealand	0.81	0.72	0.71
21 Finland	0.68	0.91	0.94	Portugal	na	na	0.64	Ireland	0.6	0.77	0.67
22 Portugal	0.93	0.83	0.89	Israel	0.58	0.63	0.63	Portugal	0.2	0.35	0.67
23 Iran	na	na	0.86	Hong Kong	0.66	0.67	0.63	Austria	0.57	0.49	0.64
24 Greece	0.67	0.81	0.80	South Korea	na	0.62	0.62	Finland	0.58	0.77	0.63
25 Norway	0.74	0.94	0.80	Taiwan	0.68	0.66	0.59	South Africa	0.74	0.71	0.62
26 Slovenia	na	na	0.79	Brazil	0.47	0.44	0.58	Hong Kong	na	na	0.61
27 Taiwan	0.74	0.84	0.77	Hungary	0.50	0.56	0.57	Poland	0.49	0.47	0.57
28 Chile	0.78	0.52	0.74	Mexico	0.54	0.55	0.56	South Korea	0.39	0.28	0.57
29 Brazil	0.48	0.61	0.73	Greece	0.44	0.41	0.52	Hungary	0.46	0.43	0.56
30 Argentina	0.69	0.58	0.69	Argentina	0.43	0.45	0.50	Taiwan	na	0.57	0.51
31 South Korea	0.58	0.75	0.67	Czech Republic	na	na	0.50	Argentina	0.41	0.43	0.50
32 Venezuela	0.96	na	0.66	Singapore	na	0.45	0.50	China	0.28	0.37	0.45
33 South Africa	0.78	0.81	0.66	Poland	0.46	0.48	0.49	Greece	0.27	0.32	0.41
34 China	0.58	0.57	0.61	South Africa	0.38	0.44	0.46	Czech Republic	na	na	0.41
35 Hungary	0.66	0.62	0.59	Egypt	0.23	0.28	0.36	Turkey	0.43	0.4	0.38
36 Czech Republic	na	na	0.57	China	0.32	0.31	0.34	Russia	na	na	0.37
37 Poland	0.52	0.56	0.56	Kenya	0.49	0.51	0.31	Croatia	na	na	0.34
38 Mexico	0.64	0.60	0.55	Saudi Arabia	0.45	0.36	0.30	Ukraine	na	na	0.34
39 Croatia	na	na	0.54	Slovakia	na	na	0.30	India	0.3	0.29	0.34
40 India	0.42	0.48	0.54	India	0.27	0.28	0.30	Slovakia	na	na	0.32
41 Bulgaria	0.34	0.51	0.53	Turkey	0.33	0.25	0.29	Bulgaria	0.24	0.25	0.24
42 Morocco	na	na	0.51	Chile	0.29	0.23	0.25	Saudi Arabia	0.2	0.3	0.19
43 Turkey	0.64	0.62	0.49	Russia	na	na	0.16	Egypt	0.16	0.18	0.17
44 Malaysia	na	na	0.49					Singapore	0.25	na	0.16
45 Slovakia	na	na	0.39								
46 Saudi Arabia	0.64	0.43	0.37								
47 Egypt	0.39	0.29	0.32								
48 Yugoslavia	0.54	0.53	0.32								
49 Romania	0.21	0.31	0.28								
50 Russia	na	na	0.28								
Country/economy	Engineering and technology			Mathematics			Physics				
	1990	1994	1999	Country/economy	1990	1994	1999	Country/economy	1990	1994	1999
1 Switzerland	1.32	1.48	1.77	Byelorussia	na	na	1.55	United States	1.54	1.50	1.47
2 Denmark	1.21	1.60	1.34	Denmark	1.33	1.74	1.36	Switzerland	1.64	1.51	1.36
3 Netherlands	1.45	1.27	1.24	Slovenia	na	na	1.36	Denmark	1.28	1.38	1.35
4 United States	1.30	1.24	1.20	United States	1.29	1.26	1.24	Germany	1.27	1.31	1.27
5 Sweden	0.96	1.07	1.11	Norway	1.35	1.20	1.23	Netherlands	1.27	1.34	1.26
6 France	1.10	1.14	1.10	United Kingdom	1.11	1.19	1.23	Austria	0.97	1.05	1.15
7 Italy	0.86	0.92	1.10	Argentina	0.77	0.87	1.16	Israel	1.19	1.05	1.12
8 Argentina	0.87	0.84	1.09	Germany	0.80	0.87	1.08	Sweden	1.09	1.06	1.10
9 Germany	0.80	0.97	1.06	Switzerland	1.16	0.99	1.07	United Kingdom	1.03	1.05	1.07
10 Spain	0.85	1.20	1.06	Belgium	0.92	0.98	1.04	New Zealand	1.01	1.08	1.07
11 Australia	1.08	1.05	1.05	Ireland	0.27	0.50	1.02	France	0.99	1.11	1.03
12 Norway	0.76	0.71	1.04	Sweden	1.10	1.16	1.02	Finland	1.09	1.14	1.01
13 Austria	0.90	0.81	1.01	Australia	1.21	1.02	1.02	Canada	0.92	1.02	0.99
14 Belgium	1.04	1.14	1.01	Italy	0.91	0.85	0.94	Belgium	0.96	0.91	0.96
15 Portugal	0.66	0.68	1.01	Netherlands	0.98	0.95	0.94	Spain	0.67	0.80	0.95
16 Czech Republic	na	na	1.00	Hong Kong	0.68	0.80	0.94	Italy	0.86	0.87	0.94
17 Japan	0.90	0.96	1.00	Canada	0.87	0.78	0.92	Ireland	0.80	1.03	0.93
18 United Kingdom	0.99	1.07	0.99	Finland	1.01	1.09	0.92	Australia	0.88	0.86	0.90
19 New Zealand	0.62	0.89	0.99	France	1.03	1.09	0.89	Hungary	0.61	0.67	0.87
20 Hungary	0.57	0.61	0.98	Tunisia	0.75	na	0.87	Japan	0.90	0.89	0.87
21 Finland	0.84	1.03	0.95	Singapore	0.22	0.67	0.87	Norway	0.67	0.79	0.84
22 Slovenia	na	na	0.94	South Korea	0.43	0.47	0.83	Portugal	0.54	0.67	0.84
23 South Korea	1.00	0.71	0.90	South Africa	1.10	0.72	0.82	Slovenia	na	na	0.83
24 Canada	0.83	0.90	0.89	Israel	0.99	0.83	0.79	Argentina	0.58	0.62	0.81
25 Israel	0.96	0.94	0.86	Spain	0.70	0.95	0.79	Greece	0.57	0.70	0.79
26 Ireland	na	1.12	0.85	Taiwan	1.04	0.49	0.78	Lithuania	na	na	0.76
27 Singapore	0.83	0.60	0.83	Venezuela	0.89	0.91	0.76	Hong Kong	na	na	0.76
28 Chile	na	na	0.80	Hungary	0.46	0.60	0.74	South Africa	0.59	0.57	0.74
29 Greece	0.81	0.81	0.80	Turkey	0.88	0.68	0.73	Chile	na	na	0.69
30 Brazil	0.73	0.73	0.78	Poland	0.57	0.54	0.73	Brazil	0.49	0.55	0.68

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-52.

**Relative prominence of scientific literature by country/economy and field: 1990, 1994, and 1999**  
 (Relative Citation Indexes<sup>1</sup>)

Country/economy	Engineering and technology			Country/economy	Mathematics			Country/economy	Physics		
	1990	1994	1999		1990	1994	1999		1990	1994	1999
31 Hong Kong	0.96	0.77	0.78	Japan	0.64	0.78	0.72	Mexico	0.66	0.55	0.67
32 Taiwan	0.93	0.80	0.78	Chile	0.97	0.94	0.71	Croatia	na	na	0.62
33 China	0.58	0.59	0.71	Portugal	0.35	0.63	0.71	Slovakia	na	na	0.62
34 Mexico	0.52	0.85	0.70	Czech Republic	na	na	0.71	South Korea	0.60	0.62	0.62
35 Turkey	0.62	0.37	0.70	Mexico	0.87	0.57	0.70	Czech Republic	na	na	0.61
36 Poland	0.64	0.59	0.69	Slovakia	na	na	0.67	Poland	0.48	0.55	0.61
37 Bulgaria	0.68	0.59	0.68	Greece	0.63	0.74	0.66	Yugoslavia	0.54	0.47	0.58
38 India	0.66	0.60	0.68	Brazil	0.58	1.02	0.65	Taiwan	0.48	0.51	0.55
39 South Africa	0.64	0.62	0.61	New Zealand	0.87	1.07	0.65	Turkey	na	0.44	0.51
40 Kuwait	0.49	0.62	0.60	Austria	0.84	0.84	0.64	India	0.39	0.47	0.51
41 Saudi Arabia	0.48	0.42	0.58	China	0.42	0.47	0.62	Bulgaria	0.44	0.39	0.48
42 Yugoslavia	0.80	0.66	0.57	Croatia	na	na	0.59	Russia	na	na	0.45
43 Romania	0.30	0.42	0.57	Bulgaria	0.45	0.76	0.59	Romania	0.31	0.41	0.44
44 Slovakia	na	na	0.57	Ukraine	na	na	0.56	Singapore	na	na	0.44
45 Egypt	0.41	0.45	0.52	Romania	0.55	0.72	0.55	China	0.30	0.36	0.43
46 Belarus	na	na	0.44	Yugoslavia	0.56	0.52	0.53	Byelarus	na	na	0.33
47 Russia	na	na	0.40	India	0.51	0.50	0.52	Ukraine	na	na	0.31
48 Ukraine	na	na	0.31	Vietnam	0.87	0.60	0.50	Egypt	0.32	0.26	0.30
49				Russia	na	na	0.46	Armenia	na	na	0.29
50				Saudi Arabia	0.59	0.88	0.42	Uzbekistan	na	na	0.18
Country/economy	Social Sciences			Country/economy	Psychology			Country/economy	Health		
	1990	1994	1999		1990	1994	1999		1990	1994	1999
1 United States	1.31	1.29	1.28	United Kingdom	1.10	1.20	1.16	Finland	1.09	0.91	1.38
2 United Kingdom	0.91	0.98	1.07	United States	1.14	1.12	1.12	United States	1.15	1.14	1.14
3 Spain	0.46	0.80	1.01	Canada	1.17	1.03	1.07	Netherlands	0.93	1.08	1.13
4 Chile	na	na	0.88	New Zealand	0.80	0.83	1.06	China	0.65	0.69	0.98
5 Netherlands	0.73	0.73	0.87	Netherlands	0.72	1.05	1.03	New Zealand	0.68	0.74	0.97
6 Sweden	0.79	0.87	0.86	Italy	0.97	0.89	0.93	Sweden	1.00	1.03	0.93
7 Canada	0.95	0.84	0.84	Argentina	0.46	0.78	0.90	United Kingdom	0.71	0.81	0.90
8 South Korea	0.56	0.52	0.84	Brazil	0.21	0.81	0.90	Spain	0.47	0.58	0.89
9 Hong Kong	0.47	0.40	0.82	Hungary	0.21	0.47	0.90	Australia	0.64	0.90	0.88
10 Portugal	na	na	0.81	Finland	0.81	1.10	0.89	Canada	0.82	0.78	0.87
11 Singapore	0.32	0.72	0.79	Belgium	0.63	0.92	0.86	Austria	0.55	0.11	0.83
12 New Zealand	0.57	0.71	0.78	Spain	0.59	0.67	0.85	Italy	0.80	0.99	0.73
13 Norway	0.43	0.92	0.76	Norway	0.91	0.90	0.82	Norway	0.63	0.83	0.71
14 Belgium	0.83	0.58	0.72	Australia	0.77	0.81	0.80	Denmark	0.35	0.88	0.70
15 Finland	0.40	0.58	0.72	Sweden	1.20	1.14	0.78	South Africa	1.06	0.24	0.67
16 Switzerland	0.38	0.50	0.66	Ireland	na	na	0.76	Ireland	0.00	0.30	0.67
17 Australia	0.63	0.67	0.65	Israel	0.74	0.63	0.74	France	0.51	0.55	0.64
18 France	0.35	0.44	0.61	France	0.54	0.73	0.74	Mexico	na	0.69	0.56
19 Italy	0.44	0.57	0.61	Germany	0.45	0.53	0.72	Israel	0.40	0.45	0.56
20 Israel	0.95	0.85	0.60	China	na	0.21	0.68	Hungary	0.79	1.06	0.53
21 Mexico	0.45	0.52	0.56	Portugal	na	na	0.66	Japan	0.53	0.81	0.53
22 Ireland	0.29	0.43	0.56	Austria	0.53	0.57	0.65	Hong Kong	0.59	0.36	0.49
23 Denmark	0.66	1.66	0.55	Denmark	0.83	0.50	0.63	Germany	0.51	0.43	0.48
24 Brazil	0.49	0.34	0.53	Hong Kong	0.77	0.40	0.62	Switzerland	0.38	0.50	0.48
25 Turkey	NA	0.38	0.52	Switzerland	0.49	0.66	0.59	South Korea	na	na	0.43
26 Banglad	0.na	0.59	0.52	Poland	0.46	0.49	0.59	Taiwan	na	na	0.43
27 Croatia	na	na	0.50	Mexico	0.81	0.44	0.55	Greece	0.00	0.00	0.41
28 China	0.21	0.47	0.47	Taiwan	na	0.22	0.46	Nigeria	0.32	0.25	0.39
29 Austria	0.26	0.44	0.45	Venezuela	na	na	0.44	Belgium	0.52	0.51	0.34
30 South Africa	0.51	0.57	0.44	Japan	0.51	0.43	0.43	Brazil	0.41	0.30	0.27
31 Germany	0.35	0.36	0.42	South Africa	0.29	0.43	0.39	Saudi Arabia	0.19	0.26	0.18
32 Greece	0.63	0.52	0.41	Greece	na	na	0.39	India	0.42	0.28	0.17
33 Japan	0.52	0.45	0.41	South Korea	na	na	0.38	Argentina	na	na	0.00
34 Taiwan	0.31	0.19	0.37	India	0.28	0.22	0.32				
35 Poland	0.24	0.36	0.35	Czech Republic	na	na	0.22				
36 Argentina	0.15	0.30	0.30	Russia	na	na	0.15				
37 India	0.22	0.22	0.24	Slovakia	na	na	0.11				
38 Hungary	0.30	0.52	0.22								
39 Nigeria	0.25	0.37	0.21								
40 Czech Republic	na	na	0.16								
41 Russia	na	na	0.13								
42 Slovakia	na	na	0.06								
43 Pakistan	na	na	0.06								

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-52.

**Relative prominence of scientific literature by country/economy and field: 1990, 1994, and 1999**  
 (Relative Citation Indexes<sup>1</sup>)

Rank		Professional		
		1990	1994	1999
1	Denmark	0.97	0.52	1.17
2	United States	1.13	1.14	1.16
3	Hong Kong	0.72	1.10	0.99
4	Canada	0.89	0.94	0.89
5	Netherlands	0.79	0.76	0.86
6	Switzerland	0.44	0.65	0.86
7	Australia	0.76	0.80	0.84
8	Belgium	0.80	0.63	0.81
9	Israel	0.89	0.75	0.80
10	France	0.62	0.54	0.80
11	Singapore	0.30	0.66	0.77
12	Hungary	1.23	0.60	0.75
13	Finland	0.41	0.34	0.73
14	South Korea	na	0.84	0.73
15	New Zealand	0.96	0.67	0.73
16	United Kingdom	0.63	0.67	0.64
17	Spain	0.26	0.44	0.63
18	Brazil	na	0.14	0.62
19	Japan	0.57	0.78	0.62
20	Norway	0.44	0.60	0.58
21	Taiwan	na	0.93	0.57
22	Sweden	0.44	0.54	0.53
23	Austria	0.35	0.54	0.51
24	Italy	0.36	0.49	0.49
25	Ireland	0.32	na	0.47
26	Turkey	na	0.37	0.45
27	South Africa	0.57	0.65	0.42
28	Poland	0.30	0.16	0.42
29	India	0.32	0.36	0.41
30	China	0.15	0.15	0.35
31	Germany	0.28	0.32	0.31
32	Saudi Arabia	na	na	0.28
33	Mexico	na	na	0.21
34	Greece	0.24	0.35	0.20
35	Portugal	na	na	0.17
36	Russia	na	na	0.08
37	Nigeria	0.28	0.28	0.05

na = not applicable

NOTE: Germany has data for West Germany only prior to 1992.

SOURCES: Institute for Scientific Information, Science Citation and Social Citation Indexes; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics.

**Appendix table 5-53**  
**Citations of foreign literature by country and region**

Citing country/region	Year	Total citations (Number)	Foreign citations (Number)	Share of foreign citations by cited region/country								
				United States	North America	Western Europe	Eastern Europe	Asia	Pacific	Latin America	Sub-Saharan Africa	Near-East
World .....	1990	2,098,582	1,120,903	na	na	na	na	na	na	na	na	na
World .....	1994	2,519,136	1,442,998	na	na	na	na	na	na	na	na	na
World .....	1999	2,749,015	1,671,901	na	na	na	na	na	na	na	na	na
United States .....	1990	936,603	277,684	na	na	63.0%	2.3%	13.9%	5.4%	1.2%	0.8%	2.6%
United States .....	1994	1,050,820	333,280	na	na	63.4%	2.6%	15.0%	4.2%	1.3%	0.6%	2.3%
United States .....	1999	1,008,357	353,797	na	na	63.7%	2.4%	15.4%	4.4%	1.6%	0.5%	2.2%
North America .....	1990	1,036,541	277,502	na	na	70.8%	2.5%	15.4%	6.2%	1.3%	0.9%	2.9%
North America .....	1994	1,170,067	336,653	na	na	71.0%	2.9%	16.5%	4.9%	1.4%	0.7%	2.5%
North America .....	1999	1,122,484	360,098	na	na	70.8%	2.6%	16.9%	5.0%	1.8%	0.5%	2.4%
Western Europe .....	1990	702,409	351,491	74.7%	80.9%	na	2.4%	9.8%	3.8%	0.8%	0.6%	1.6%
Western Europe .....	1994	897,606	453,971	73.5%	79.8%	na	2.8%	11.0%	3.3%	1.0%	0.6%	1.5%
Western Europe .....	1999	1,036,360	507,888	70.1%	76.5%	na	3.2%	12.7%	3.9%	1.4%	0.6%	1.7%
Eastern Europe .....	1990	75,349	51,254	43.9%	47.8%	37.7%	na	10.2%	1.9%	0.7%	0.3%	1.3%
Eastern Europe .....	1994	75,705	53,327	41.0%	44.9%	40.6%	na	10.5%	1.6%	0.9%	0.3%	1.2%
Eastern Europe .....	1999	87,453	63,964	36.0%	39.6%	44.6%	na	11.0%	2.0%	1.2%	0.2%	1.4%
Asia .....	1990	178,525	112,185	57.7%	61.7%	32.2%	1.7%	na	2.3%	0.7%	0.4%	1.1%
Asia .....	1994	248,148	157,587	56.4%	60.5%	33.5%	1.9%	na	2.0%	0.7%	0.3%	1.1%
Asia .....	1999	337,959	216,813	51.8%	56.0%	36.8%	2.2%	na	2.4%	1.0%	0.3%	1.3%
Pacific .....	1990	52,650	38,176	51.2%	56.8%	34.8%	0.8%	5.4%	na	0.5%	0.7%	1.0%
Pacific .....	1994	62,649	47,438	49.2%	54.8%	34.8%	1.1%	6.9%	na	0.7%	0.7%	1.0%
Pacific .....	1999	75,818	58,075	46.4%	51.8%	37.1%	1.1%	7.5%	na	1.0%	0.5%	1.0%
Latin America .....	1990	19,386	15,360	50.2%	54.8%	31.6%	1.9%	6.7%	2.7%	na	0.9%	1.4%
Latin America .....	1994	25,345	20,358	47.3%	51.8%	34.1%	2.3%	7.2%	2.5%	na	0.8%	1.3%
Latin America .....	1999	44,732	35,564	41.2%	45.4%	38.2%	2.6%	9.1%	2.8%	na	0.6%	1.4%
Sub-Saharan Africa .....	1990	9,514	6,831	43.7%	48.5%	35.4%	0.9%	6.8%	5.1%	1.5%	na	1.7%
Sub-Saharan Africa .....	1994	10,999	8,331	40.6%	45.3%	37.2%	2.1%	7.7%	4.1%	1.8%	na	1.8%
Sub-Saharan Africa .....	1999	10,286	7,985	36.6%	40.7%	40.8%	1.6%	8.9%	4.5%	2.1%	na	1.5%
Near East & North Africa .....	1990	24,210	19,002	56.0%	59.8%	29.2%	1.2%	6.3%	2.3%	0.7%	0.6%	na
Near East & North Africa .....	1994	28,618	23,262	52.0%	55.9%	31.6%	2.3%	7.0%	1.8%	0.7%	0.7%	na
Near East & North Africa .....	1999	33,926	27,513	44.6%	48.6%	35.9%	2.4%	9.3%	2.2%	1.3%	0.4%	na

na = not applicable

NOTES: Citations are on the basis of a three-year window with a two-year lag; for example, 1999 citations consist of papers published in 1999 citing articles published in 1995-97. Citations and articles are those that are classified in the 1985 ISI journal set.

SOURCE: Institute for Scientific Information, Science Citation and Social Citation Indexes; CHI Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

Appendix table 5-54.

**U.S. patent citations to scientific literature, by field and by country/region: 1987–2000**

(Percent share)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>Cited field</b>														
<b>Total (number) .....</b>	13,459	15,138	19,417	19,422	23,390	28,077	38,493	40,266	46,961	66,129	102,111	143,541	143,215	142,008
Total (percentage) .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Clinical medicine .....	23.1	23.4	22.7	24.1	23.8	24.7	25.9	24.3	26.8	27.7	29.9	30.5	30.0	29.2
Biomedical research .....	24.2	25.1	26.8	25.7	29.3	32.0	35.9	34.0	34.9	40.1	44.3	47.4	47.0	45.3
Biology .....	2.5	2.6	2.7	2.8	3.2	2.5	2.3	2.9	2.8	3.1	2.2	2.6	3.2	2.9
Physics .....	15.9	17.0	19.3	17.6	16.8	15.0	12.8	14.1	11.6	8.4	6.6	5.4	5.8	6.5
Chemistry .....	19.3	17.7	16.3	17.8	16.7	17.0	15.5	15.4	15.1	12.7	11.4	9.1	9.1	10.6
Earth and space .....	1.0	0.7	0.8	0.7	0.7	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3
Engineering and technology .....	13.9	13.5	11.3	11.3	9.4	8.4	7.2	8.8	8.5	7.6	5.3	4.8	4.7	5.3
Mathematics .....	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
<b>Cited country/region</b>														
<b>Total (number) .....</b>	13,459	15,138	19,417	19,422	23,390	28,077	38,493	40,266	46,961	66,129	102,111	143,541	143,215	142,008
Total (percentage) .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
United States .....	55.9	55.7	58.6	58.4	58.7	59.0	59.0	58.0	58.7	59.4	60.0	61.1	59.9	59.1
Canada .....	2.8	2.6	2.6	2.8	2.7	3.0	2.9	3.2	3.4	3.5	3.3	3.4	3.5	3.5
Western Europe .....	24.4	23.3	22.2	22.5	21.9	22.4	22.8	22.5	22.8	22.9	23.4	23.2	23.8	24.6
United Kingdom .....	8.5	7.4	7.3	7.7	7.1	6.9	7.0	6.7	7.1	7.1	7.0	7.1	7.0	7.2
France .....	3.5	3.5	2.7	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.3	3.5	3.5	3.6
Germany .....	4.2	4.2	4.1	4.0	3.8	4.3	4.3	4.2	4.3	4.1	4.6	4.2	4.3	4.6
Asia .....	11.0	13.1	12.2	12.4	12.7	11.5	11.2	12.0	11.2	10.1	9.1	8.5	8.9	9.0
Japan .....	10.1	11.8	11.3	11.4	11.6	10.4	10.1	10.7	9.9	9.0	8.1	7.5	7.8	7.7
Pacific .....	1.3	1.4	1.5	1.3	1.3	1.5	1.5	1.6	1.6	1.6	1.8	1.6	1.7	1.6
Eastern Europe .....	2.8	2.3	1.6	1.3	1.4	1.2	1.3	1.3	1.2	1.1	1.0	1.0	0.9	0.9
Near East .....	1.2	1.1	0.9	0.9	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	0.9
Latin America .....	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2
Sub-Saharan Africa .....	0.2	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1

NOTES: The number of citations is based on a three-year lag with a 12-year window of articles in a comprehensive set of journals numbering approximately 5,000 covered by the Institute for Scientific Information. For example, the 2000 citations would be patents issued in 2000 citing papers between 1997 and 1986, and so forth. Percent share refers to the share of the cited paper's scientific field and its nationality based on the institutional address of the cited paper. Science field and country region is determined by CHI's field classification of the journal and the institutional address of the cited publication.

SOURCES: U.S. Department of Commerce, Patent and Trademark Office; Institute for Scientific Information, Science Citation Index; CHI Research, Inc., Science Indicators and patent databases; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

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Appendix table 5-55.

**Citations of U.S. patents to U.S. literature, by field and sector: 1987, 1990, 1994, and 2000**  
 (Percent share)

Cited Sector	Cited scientific field												
	All fields	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Engineering			Social science	Professional fields	Health sciences	
							Earth and space	and technology	Mathematics				
<b>2000</b>													
<b>Total citations (number)</b> .....	91,389	26,355	44,857	2,300	7,649	5,240	284	4,403	29	118	19	86	46
Total (percentage) .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Academic .....	60.0	60.3	61.1	69.3	64.3	46.2	63.7	48.5	62.1	73.7	78.9	86.0	45.7
Industry .....	20.1	16.0	17.3	14.7	25.4	41.6	16.9	41.7	20.7	6.8	15.8	10.5	26.1
Federal Government .....	7.5	9.3	7.8	11.2	3.4	3.9	9.2	2.7	0.0	1.7	0.0	0.0	8.7
State and local government .....	0.4	0.7	0.4	0.1	0.0	0.0	1.1	0.1	0.0	0.8	0.0	0.0	2.2
FFRDCs .....	1.8	0.7	1.4	0.4	3.9	6.7	4.2	4.2	10.3	0.0	0.0	0.0	0.0
Nonprofit .....	9.7	12.1	11.6	3.6	2.8	1.1	1.4	1.5	0.0	11.0	0.0	1.2	8.7
Unknown .....	0.6	0.8	0.4	0.5	0.2	0.3	2.1	1.3	3.4	4.2	0.0	1.2	4.3
<b>1997</b>													
<b>Total citations (number)</b> .....	66,277	19,584	31,832	1,412	5,849	3,907	181	3,419	28	35	0	0	25
Total (percentage) .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Academic .....	57.9	58.8	59.2	68.7	63.6	42.4	51.9	44.5	67.9	65.7	na	na	44.0
Industry .....	20.5	15.8	16.9	13.5	27.1	42.2	24.3	46.7	25.0	5.7	na	na	0.0
Federal Government .....	8.6	10.4	9.4	12.6	3.3	5.6	9.9	2.6	0.0	2.9	na	na	12.0
State and local government .....	0.6	1.0	0.6	0.2	0.2	0.0	1.1	0.0	0.0	0.0	na	na	20.0
FFRDCs .....	1.7	0.9	1.2	0.6	2.7	7.2	6.1	3.9	0.0	0.0	na	na	0.0
Nonprofit .....	10.1	12.3	12.2	4.0	2.9	2.2	2.2	1.3	0.0	17.1	na	na	16.0
Unknown .....	0.6	0.8	0.5	0.2	0.2	0.3	2.8	0.9	0.0	0.0	na	na	0.0
<b>1994</b>													
<b>Total citations (number)</b> .....	24,890	6,291	9,221	646	2,991	3,393	102	2,210	13	13	0	0	5
Total (percentage) .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Academic .....	55.7	60.3	60.4	67.8	63.5	35.7	46.1	40.3	84.6	76.9	na	na	40.0
Industry .....	24.4	13.7	17.0	14.2	27.3	48.0	28.4	48.3	7.7	0.0	na	na	0.0
Federal Government .....	8.1	10.5	9.6	14.1	3.0	5.4	10.8	4.3	0.0	15.4	na	na	0.0
State and local government .....	0.7	1.2	0.8	0.3	0.1	0.0	2.9	0.0	0.0	0.0	na	na	40.0
FFRDCs .....	2.8	0.8	1.3	0.5	3.5	8.9	2.9	5.1	7.7	0.0	na	na	0.0
Nonprofit .....	7.8	12.8	10.3	2.3	2.4	1.8	3.9	1.5	0.0	0.0	na	na	0.0
Unknown .....	0.4	0.6	0.4	0.3	0.1	0.1	1.0	0.5	0.0	0.0	na	na	0.0
<b>1990</b>													
<b>Total citations (number)</b> .....	11,940	2,984	3,427	298	1,633	2,119	69	1,380	2	23	0	0	1
Total (percentage) .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Academic .....	51.9	58.4	61.9	67.1	56.5	34.4	37.7	31.0	100.0	87.0	na	na	0.0
Industry .....	28.1	12.9	15.3	9.7	34.5	49.3	36.2	56.7	0.0	0.0	na	na	0.0
Federal Government .....	8.4	10.9	10	19.8	3.3	6.8	11.6	4.6	0.0	0.0	na	na	0.0
State and local government .....	0.7	1.5	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	na	na	0.0
FFRDCs .....	3.1	0.7	1.2	0.3	3.1	8.3	7.2	5.6	0.0	0.0	na	na	0.0
Nonprofit .....	7.3	15.0	10.0	2.0	2.3	1.0	4.3	1.2	0.0	4.3	na	na	0.0
Unknown .....	0.4	0.5	0.5	0.3	0.1	0.1	0.0	0.7	0.0	0.0	na	na	0.0

See explanatory notes, if any, and SOURCE at end of table

Appendix table 5-55.

**Citations of U.S. patents to U.S. literature, by field and sector: 1987, 1990, 1994, and 2000**  
 (Percent share)

Cited Sector	Cited scientific field												
	All fields	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth and space	Engineering and technology			Social science	Professional fields	Health sciences
								Mathematics	Psychology				
<b>1987</b>													
<b>Total citations (number) .....</b>	7,845.0	1,889.0	2,133.0	164.0	1,127.0	1,226.0	101.0	1,186.0	0.0	13.0	1.0	1.0	0.0
Total (percentage) .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	na	100.0	100.0	100.0	100.0
Academic .....	49.1	56.7	62.4	58.5	58.6	28.2	39.6	24.8	na	84.6	100.0	0.0	na
Industry .....	28.6	13.7	12.0	9.8	30.4	52.3	24.8	59.5	na	7.7	0.0	0.0	na
Federal Government .....	9.2	12.1	10.0	28.7	4.9	6.9	17.8	5.9	na	0.0	0.0	0.0	na
State and local government .....	0.8	1.6	1.2	0.0	0.0	0.2	3.0	0.0	na	0.0	0.0	0.0	na
FFRDCs .....	3.7	1.2	0.7	0.6	2.8	11.2	10.9	6.0	na	0.0	0.0	0.0	na
Nonprofit .....	8.1	14.0	13.4	1.8	2.9	1.0	1.0	3.1	na	7.7	0.0	100.0	na
Unknown .....	0.4	0.6	0.2	0.0	0.2	0.2	0.0	0.6	na	0.0	0.0	0.0	na

FFRDCs = Federally Funded Research and Development Centers. na = not applicable.

NOTES: The number of citations by U.S. patents is based on a three-year lag with a 12-year window of U.S. articles in the entire set of approximately 5,000 journals covered by the ISI. For example, the 2000 citations would be patents issued in 2000 citing U.S. papers published 1997 and 1986, and so forth. Sector is determined by the institutional address of the cited paper. Scientific field is determined by CHI's classification of the journal. Computer sciences is included in engineering and technology.

SOURCES: U.S. Department of Commerce, Patent and Trademark Office; CHI Research, Inc., Science Indicators and patent databases; and National Science Foundation, Division of Science Resources Statistics (NSF/SRS).

Appendix table 5-56.

**U.S. patents awarded to all U.S. universities and colleges and to top 100 patenting institutions in 1990s: 1982–98**

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
<b>Number of academic institutions awarded patents</b>																	
Institutions awarded patents ...	75	85	103	118	124	128	126	156	153	161	159	168	175	171	184	184	180
Public .....	43	52	56	65	75	70	69	89	87	93	93	102	102	100	106	109	102
Private .....	31	32	45	49	46	54	52	62	61	61	59	61	66	65	72	69	71
<b>Patents awarded to academic institutions</b>																	
All academic institutions .....	464	437	552	589	670	820	814	1,228	1,184	1,340	1,542	1,620	1,780	1,879	2,155	2,436	3,151
Public .....	241	224	259	308	357	397	406	656	672	794	909	940	1,068	1,189	1,338	1,503	1,824
Private .....	174	161	237	238	263	366	370	536	488	518	608	655	680	662	789	904	1,300
100 largest patenting, 1990s .....	386	357	457	482	548	696	704	1,090	1,078	1,212	1,420	1,486	1,634	1,713	1,970	2,245	2,920
Public .....	228	206	240	267	311	359	373	597	613	721	839	866	989	1,096	1,241	1,391	1,699
Private .....	158	151	217	215	237	337	331	493	465	491	581	620	645	617	729	854	1,221
Percentage of all patents awarded to 100 largest .....	83.2	81.7	82.8	81.8	81.8	84.9	86.5	88.8	91.0	90.4	92.1	91.7	91.8	91.2	91.4	92.2	92.7
<b>Patents awarded to public universities among top 100 in 1990s</b>																	
University of California .....	42	48	46	42	54	67	60	81	65	84	81	115	163	213	266	277	395
University of Texas .....	7	5	8	20	25	21	21	51	56	84	73	86	99	90	88	81	98
University of Wisconsin .....	17	13	16	17	17	11	20	27	16	45	43	57	48	48	64	62	83
University of Florida .....	0	6	10	7	10	13	21	33	33	38	42	34	26	31	36	43	52
Iowa State University .....	15	10	14	21	9	15	15	28	30	39	23	29	37	37	38	36	53
State University of New York ...	8	2	11	5	11	18	10	25	20	27	34	30	37	31	37	45	51
University of Minnesota .....	10	5	6	11	16	28	26	40	38	32	31	27	28	25	31	32	43
University of Michigan .....	2	2	1	1	10	6	14	23	27	21	21	19	28	30	25	53	50
Michigan State University .....	1	3	3	3	10	6	8	2	7	11	19	13	21	15	32	41	59
North Carolina State																	
University .....	1	0	2	3	4	6	5	10	14	11	24	27	32	31	26	24	26
University of Utah .....	14	15	9	11	7	12	9	13	14	5	13	20	22	17	32	31	37
University of Washington .....	7	2	3	1	2	1	6	5	7	11	12	11	13	17	26	37	47
University of North Carolina ....	0	1	0	0	3	2	2	6	8	3	11	14	13	21	22	39	29
Georgia Institute of																	
Technology .....	8	3	6	11	9	9	7	8	18	11	16	16	20	21	22	16	17
Ohio State University .....	6	9	3	12	5	13	14	13	10	15	21	10	10	17	22	27	24
Rutgers University .....	0	0	1	1	0	2	2	7	2	15	12	15	18	20	18	21	26
Louisiana State University .....	0	1	1	1	1	3	4	9	4	5	20	16	11	14	16	22	38
Texas A&M University .....	3	2	3	8	3	6	9	8	9	12	14	22	20	16	16	14	21
University of Maryland .....	0	1	0	0	3	2	2	1	4	4	14	21	15	21	20	18	24
University of Nebraska .....	4	0	5	1	1	1	4	0	3	4	4	10	16	21	29	24	24
University of Pittsburgh .....	2	5	8	3	8	10	6	11	11	16	10	10	10	13	12	17	32
University of Colorado .....	0	0	0	0	0	1	0	4	9	6	19	7	14	18	16	21	19
Pennsylvania State																	
University .....	0	0	0	0	0	1	1	1	3	6	7	10	16	18	20	19	26
University of Illinois .....	7	8	8	10	12	4	9	15	7	8	10	13	14	12	16	17	21
Purdue University .....	11	11	14	18	9	4	2	11	15	11	5	6	11	10	12	24	22

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-56.

**U.S. patents awarded to all U.S. universities and colleges and to top 100 patenting institutions in 1990s: 1982–98**

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Virginia Polytechnic Institute ....	0	0	0	0	0	0	2	7	4	11	18	12	16	6	14	17	16
University of Iowa .....	5	3	4	1	8	8	6	8	12	6	7	11	9	17	11	14	25
University of Virginia .....	8	4	2	1	4	3	4	8	12	11	9	7	5	10	13	13	20
University of Georgia .....	0	7	7	5	6	4	0	3	5	8	10	18	7	10	12	11	18
University of Alabama .....	3	1	1	5	3	5	3	3	6	3	7	6	7	9	13	19	27
University of Akron .....	4	1	3	3	2	0	6	6	9	14	11	9	17	11	12	5	9
Wayne State University .....	2	1	0	1	5	6	7	16	9	8	16	12	14	9	8	8	10
University of New Mexico .....	0	0	0	2	3	1	3	9	9	10	11	5	9	15	8	13	12
University of Tennessee .....	1	0	1	5	8	8	8	12	14	10	12	4	5	14	8	13	9
Arizona State University .....	0	0	1	1	1	2	0	9	9	12	6	3	6	12	19	12	6
University of Kentucky .....	6	6	7	5	7	4	7	6	4	7	7	4	3	11	14	14	21
University of Missouri .....	9	5	4	0	3	8	9	5	6	7	9	8	7	10	8	16	13
University of Oklahoma .....	2	1	2	3	2	2	6	2	4	4	7	13	7	11	9	16	9
Temple University .....	2	0	2	0	1	5	7	10	9	3	14	9	9	11	7	9	6
Oregon Health Sciences University .....	0	0	0	0	0	3	0	3	4	6	5	5	6	10	12	16	13
University of South Florida.....	0	0	0	0	1	0	0	2	2	7	5	7	4	6	13	14	18
University of Arkansas .....	0	0	0	0	1	1	1	2	3	10	16	8	10	5	6	8	9
Kansas State University .....	2	4	3	2	4	4	3	4	1	7	7	9	20	11	9	4	7
University of Connecticut .....	0	0	0	1	1	2	1	2	8	3	9	9	2	8	9	13	11
University of Cincinnati .....	0	0	2	2	1	8	3	8	9	9	7	8	7	8	7	10	5
Clemson University .....	0	0	2	2	1	3	3	6	6	2	10	4	10	8	7	9	8
University of Delaware .....	12	6	5	9	7	5	8	8	11	10	10	5	4	5	5	4	6
Oregon State University .....	0	1	0	2	3	0	2	1	1	6	9	5	13	6	4	7	8
Indiana University .....	0	3	2	4	0	3	1	6	1	3	6	1	7	6	8	11	12
Florida State University .....	0	0	1	0	2	2	1	1	1	1	2	9	5	10	8	6	13
University of Toledo .....	2	1	2	0	1	0	0	3	0	2	4	7	6	14	7	9	6
University of Hawaii .....	1	1	0	2	0	1	3	2	6	2	5	8	6	7	6	6	6
University of Medicine and Dentistry .....	1	1	0	1	4	7	2	4	7	2	6	1	4	5	3	7	15
University of Central Florida ....	0	0	0	0	0	0	0	1	0	0	0	4	4	6	9	14	12
University of Houston .....	0	0	0	0	1	0	0	3	3	4	1	3	5	8	6	4	5
University of Massachusetts Medical Center .....	0	0	0	0	0	0	0	3	2	3	3	2	1	2	10	9	7
University of Arizona .....	1	2	1	2	2	0	0	1	2	1	1	3	6	4	4	9	8
University of Kansas .....	0	2	2	1	0	2	0	1	3	4	7	3	2	2	6	3	6
Virginia Commonwealth University .....	0	0	0	0	0	0	0	0	1	1	3	6	4	2	4	7	6
<b>Patents awarded to private universities among top 100 in 1990s</b>																	
Massachusetts Institute of Technology .....	51	47	47	35	45	63	64	101	109	101	125	112	99	104	119	102	138
Stanford University .....	4	16	36	38	33	48	54	43	36	57	42	50	62	54	55	64	79
Cornell University .....	6	10	14	20	13	30	16	22	34	40	41	35	39	36	52	50	65

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-56.

**U.S. patents awarded to all U.S. universities and colleges and to top 100 patenting institutions in 1990s: 1982–98**

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
California Institute of Technology .....	19	16	15	16	23	27	18	56	30	36	32	29	46	38	24	46	93
University of Pennsylvania .....	1	2	4	5	1	2	1	9	19	18	26	34	37	25	45	55	69
Johns Hopkins University .....	8	6	10	15	18	18	21	27	15	25	20	33	23	28	27	48	79
Columbia University .....	0	2	3	4	7	6	15	19	16	8	17	17	18	18	33	35	55
Harvard University .....	11	10	7	1	2	9	17	15	23	9	16	17	16	14	32	28	49
Washington University .....	0	1	1	3	1	7	6	12	7	22	18	18	19	21	18	22	41
Duke University .....	3	3	6	4	6	4	9	11	6	8	14	23	23	13	9	8	20
Rockefeller University .....	3	1	3	5	4	9	11	6	8	14	23	23	13	9	8	20	35
New York University .....	7	3	4	5	3	5	4	10	14	8	11	19	16	15	19	23	23
Boston University .....	1	2	2	3	6	9	9	9	11	6	22	15	14	14	16	20	19
Yale University .....	0	2	2	5	3	12	6	11	10	4	12	14	13	16	7	20	34
Northwestern University .....	7	3	2	2	8	10	10	7	5	4	8	8	12	18	10	27	35
Thomas Jefferson University ...	2	4	10	5	3	3	2	7	5	7	8	9	13	14	15	25	29
University of Southern California .....	5	1	7	5	5	4	7	8	6	5	18	13	15	6	15	18	16
Emory University .....	0	0	0	1	1	0	0	7	3	10	6	14	5	11	12	12	35
Princeton University .....	0	0	0	0	0	2	1	12	4	13	4	11	7	12	13	16	24
Baylor College of Medicine .....	3	1	2	2	2	7	3	7	8	4	6	9	9	4	15	15	27
Northeastern University .....	1	0	0	3	2	2	1	3	4	6	11	10	15	16	11	12	11
University of Chicago .....	2	0	2	0	0	1	6	7	2	0	0	6	14	16	13	22	22
Carnegie-Mellon University .....	0	0	3	3	3	1	2	5	3	5	10	4	8	10	13	9	26
University of Rochester .....	8	9	6	2	8	9	11	11	13	12	10	11	10	6	3	5	15
Mayo Foundation .....	0	0	0	3	1	1	0	3	4	4	8	9	4	6	12	17	20
Vanderbilt University .....	2	1	0	0	5	4	4	4	5	7	4	7	6	9	6	11	16
Case Western Reserve University .....	0	0	1	1	6	3	1	1	2	1	9	6	8	8	6	9	15
City University of New York ....	4	3	2	1	2	1	3	2	2	5	3	3	4	5	9	13	16
Georgetown University .....	1	4	5	1	0	4	3	1	5	3	5	5	7	6	7	8	11
Brown University .....	0	0	1	2	2	1	3	3	3	4	5	1	4	6	6	9	18
Tufts University .....	0	0	0	0	0	1	2	7	1	5	7	9	6	3	8	4	11
Tulane University .....	0	0	1	2	1	1	3	4	4	7	5	6	6	5	7	4	9
Brigham Young University .....	0	1	3	3	6	2	1	8	9	5	9	13	3	3	2	5	2
Rensselaer Polytechnic Institute .....	4	0	4	5	7	2	2	5	4	2	2	6	7	7	12	6	4
Syracuse University .....	0	0	1	2	3	2	5	4	9	2	5	5	3	1	2	9	7
Yeshiva University .....	1	1	1	4	1	6	1	5	1	0	1	4	3	3	11	6	14
University of Miami .....	2	0	4	4	3	15	5	5	1	1	5	2	5	5	5	14	3
Brandeis University .....	0	0	1	0	0	1	1	9	4	5	4	2	2	3	6	4	9
Alfred University .....	0	1	5	3	1	1	0	1	6	5	5	6	4	3	4	3	2

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 5-56.

**U.S. patents awarded to all U.S. universities and colleges and to top 100 patenting institutions in 1990s: 1982–98**

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
<b>Patents awarded to affiliated organizations among top 100 in 1990s</b>																	
Associated Universities, Inc. ....	0	0	0	0	0	0	1	3	7	7	5	5	14	12	12	13	9
Research Triangle Institute .....	2	3	0	2	2	4	2	3	6	8	4	8	7	7	2	4	6

NOTES: Top 100 patenting institutions are determined by the sum of their patents during the 1990s. Institutions are listed in declining order.

SOURCES: U.S. Patent and Trademark Office, *Technology Assessment and Forecast Report: U.S. Universities and Colleges, 1996–99* (Washington, DC, 2000) and National Science Foundation, Division of Science Resources Statistics (NSF/SRS), special tabulations (Arlington, VA).